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1-

ON THE
CATTLE PLAGUE.

ON THE
CATTLE PLAGUE:

OR,

Contagious Typhus in Horned Cattle.

ITS HISTORY, ORIGIN, DESCRIPTION, AND TREATMENT.

BY

H. BOURGUIGNON,

Doctor of the Faculté de Paris, Fellow of the Société de Médecine de Paris;
Laureate of the Institute of France, Member of the
Legion of Honour, etc.

*"Scribo nec ficta, nec picta, sed quæ ratio,
sensus et experientia docent."*

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TO

MISS BURDETT COUTTS.

MADAM,

THE numerous services which you have rendered, and the interest you have shown in the calamitous epizootic which at this moment decimates the noble herds of England, have prompted me to dedicate the following pages to you, satisfied that I am only giving public expression to the homage felt for you by many of your fellow-countrymen.

I have the honour to be, Madam,

With respect, your obedient servant,

H. BOURGUIGNON.

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PREFACE.

NATIONS, during the successive phases of their evolution on the globe, in which they advance from a state of infancy and barbarism to one of virility and civilization, from civilization to decadence or senility; and from decadence to their final extinction, are liable to numberless calamities.

These calamities are produced by moral causes, and are then called social Revolutions; and in other instances from physical causes, and then they are termed Cataclysms, Epidemics, or Epizootics.

In these crises, the initiative and devotion of individuals, the public administration, and the application of knowledge acquired in the Arts and Sciences, afford collectively an infal-

lible criterion for ascertaining the position which a nation occupies in the scale of civilization, and the value of its religious, social, and political institutions.

Calamities always leave behind them disasters and victims, but they bequeath also a precious legacy. Nations which are called upon for fresh and progressive efforts, find in the experience they have gained a new source of strength and means of future greatness. I am convinced that this will be the case with England; though, helpless for the moment, and unable to stay the Cattle Plague which now ravages her entire extent, she will in future be found better prepared to resist the inroads of such a direful enemy.

No branch of human knowledge has been more rudely tested during the present epizootic than medical science. Many persons have been astounded at its helplessness; but if they had reflected at what a distance medicine has to follow in the wake of the exact sciences by which it is furnished with instruments for

prosecuting its researches,—that organic chemistry progresses but slowly,—that the Cattle Plague was entirely unknown to the present generation of medical men in England,—and that the means for its scientific and practical study have been therefore wholly wanting, they would have been less surprised to find that it is as difficult to cure the Cattle Plague as it is to cure phthisis, cancer, hydrophobia, and the cholera, against which medicine but too often is of little avail.

In times of great national calamity it behoves every one to contribute in proportion to his talents, fortune, or abilities, to alleviate the effects of the common misfortune. The poor man's mite, and the honest intention of the most insignificant, when added to the budget of common efforts, have their relative value; and it is for these reasons that I have published the following monograph on the Cattle Plague.

If it assists in any way to the extinction of the present epizootic, or if it serve to point

out the necessity of combining the study of comparative pathology with that of medicine, I shall feel that I have contributed something which may favour my claim to be enrolled among the citizens of England.

This book, as may easily be seen, was originally written in my native language. A few kind and obliging friends—more particularly Mr. Taylor Sinnett, Drs. Clapton and Gervis, of St. Thomas's Hospital, and Mr. Berridge, of the British Museum—have rendered me the greatest assistance in the translation. Without the guidance of such competent auxiliaries I could not have performed my arduous task.

I therefore beg to return to those gentlemen, and to all those who have assisted me on this occasion, my sincerest and most grateful thanks.

H. B.

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INTRODUCTION.

EVERYONE is talking of the CATTLE PLAGUE ! But why should we borrow this sinister and gloomy denomination from the middle ages and from the people's vocabulary ? Is this, then, an unknown and incurable disease ? Is this the first time that it has made its appearance on the soil of Great Britain ? To judge by the manner in which the diffusion of this complaint has been met, accounted for, explained, and discussed, one might imagine it was so ; and yet the mere observation of its causes, its symptoms, and its signs and effects on the bodies of the diseased animals, besides a few references to the medical library, would easily have testified that nature did not wait until the second half of the 19th century to generate a new distemper. No ! Nothing new has appeared for a long time in the worlds of space. The cosmic phenomena pursue their perpetual course, and the organic

phenomena, *à fortiori*, do the same. Life, throughout the whole range of the animal kingdom, whatever may be its changes and fluctuations, submits to the fixed and invariable laws which hold dominion over health and disease. Our presumption and ignorance alone can account for the astonishment we manifest, not only when we witness great general calamities, but even when we look upon those simple morbid derangements which organic matter, both animal and vegetable, is continually undergoing on the globe, in the natural progress of destruction and dissolution.

The habit we most of us have contracted of confining our observations to the phenomena which strike our eyes, instead of fixing them on the general causes by which these phenomena have been produced; the forgetfulness of some, in others the want of acquaintance with general and comparative pathology, have in this instance led many conscientious inquirers to misapprehend both the nature and the treatment of the cattle complaint. It is in vain that we have subdivided and classed medical science—in vain that we have arbitrarily instituted a veterinary medicine and a

human medicine; nature, in her acts, has no such subtleties. With nature, organic matter is organic matter, life is life; and although it may be true that both organic matter and life become more complex, and continue to rise in perfection till they reach man, it is quite as true that the laws of pathology and physiology are the same in all, and that it is just as difficult to cure the typhus of the ox as that of man. As, therefore, it is because we overlooked these fundamental truths, that the outbreak of the cattle distemper found us unprepared, we must treat the subject with all the gravity which is its due.

Let it not, however, be feared that the special fact of the *so-called* Cattle Plague will be lost sight of amidst a crowd of scientific generalities. No; collateral reflections, seemingly foreign to the main argument, will concur to elucidate it; and all these rays of light will converge to a common centre, reflecting, we flatter ourselves, some evident facts and practical truths.

This work on the contagious typhus of the ox is divided into four principal parts.

The first part contains the history of this

typhus from the remotest times down to the present day. It is divided into several sections.

The second part, which gives the description of the disease, is subdivided into four chapters.

The first chapter treats of general typhus, in order that a perfect understanding may be arrived at as to the name and definition of the particular distemper which affects the ox.

The second relates to the causes and origin of the disease.

The third treats of its symptoms, its progress, &c.

The fourth contains its mode of treatment.

The third part gives some plain instructions for the benefit of farmers, cattle-dealers, and dairymen.

The fourth part gives a development of the scientific means and safeguards to be adopted, in order that this country shall never relapse into that state of helpless panic to which a want of preparation exposed it when the present epizootia began its ravages.

FIRST PART.

*The History of the Contagious Typhus of the Ox,
from the remotest times down to the present
day.*

I.

GENERAL, local, and particular causes of destruction are constantly reacting on organized creatures, and these causes account for those *epiphytic* diseases which infest plants, the *epizootic* diseases which spread mortality among the brute creation, and the *epidemic*, which strike and are fatal to the human species. Thus it is that we particularize at present, in the vegetable kingdom, the disease which has attacked the vines, olive-trees, and potatoes; in the animal kingdom, the silkworm sickness, and the cholera, and the typhoid fever of cattle: so that we may safely say, that one or other of these diseases is always, at a given

moment, raging in some part of the globe among some species of animal, either birds, pigs, horses, sheep, horned cattle, or, in fine, attacks man himself.

When, however, the peccant invasion falls only on the vegetables and animals situated at our antipodes, we seldom hear of the ravages it commits; and when we do, forgetful of the affinity which links together all the organic beings on the earth and their mutual dependence, nothing can exceed the indifference we show to these calamities. Then, when the danger threatens us nearer home, or when the evil has invaded us, we have recourse to quarantine as the grand preservative to shield us. But this preservative remedy is most frequently deceptive—a mere illusion; for the real plague, typhus and cholera, borne along by the winds of heaven, pass over the longest distances and the highest obstacles, and baffle all our calculations; teaching us, by their successive returns, that we shall continually be exposed to their destructive havoc so long as we neglect to eradicate the evil at its original source, that is, in those countries from which it emanates.

And this is the place to observe, that the cholera morbus threatens to keep a permanent footing in the English possessions of India, because the public works, by means of which the great rivers used to be confined to their beds, have not of late been repaired and kept in good order in those countries; owing to which neglect, their waters overflow the plains, leaving, when they subside, those pestilential deposits which afford a perpetual incubation to the cholera.

We are induced to dwell thus on the general causes of these diseases, because the sick plants, on which dumb animals feed, and the sick animals, on which man himself feeds, have a continual relation of cause and effect; and we shall have to refer to this subject and give it weight, when we come to speak of the treatment of these diseases.

It is an important fact, which deserves our most pointed attention and consideration, that the vital resistance inherent in the animal frame to withstand the attacks of these contagious diseases, is very far from being the same throughout the whole kind. Man, in this respect, is the most favoured and best forti-

fied; he is able, without much degenerating, to inhabit any latitude, to go with a sort of impunity, if his calling require him to do so, amidst the most pestilential emanations, and to continue for hours inhaling their baneful fumes. We could quote many striking examples of this resisting power in man. But there is one which we have recently witnessed, and which all can appreciate. We refer to the slaughter-house of the great Metropolitan Market. Here we saw, in lumps and fragments, every variety of corrupt *detritus* of animals which had been seized with the contagious typhus; we saw the animals, too, being felled and slaughtered and dissected, in a high temperature which rendered the air so poisonous that we could hardly breathe it; yet amidst all this infection the workmen employed to move and handle these revolting wrecks appeared indifferent to the scene, and quite in their usual health. No living animal besides man could stand such a trial; no other could breathe for hours, and day after day, like these workmen, an atmosphere so charged with decomposing impurities.

We say, therefore, that man may expose

himself, with less danger to his life than any other animal, to those pernicious causes which produce and develop contagious diseases. Next to him, with respect to this power of vital resistance, come the omnivorous animals, then the carnivorous, and last of all, the herbivorous, in which this faculty is very feeble indeed.

This prime consideration, to be fully understood and appreciated by unscientific readers, would require explanations beyond the scope of this work. Let us, however, for the present establish the fact, that herbivorous animals, such as sheep and horned cattle, offer but a very weak resistance to the causes which generate infectious and epizootic diseases, and let us do our best to prove it by demonstration; for if this truth be once admitted, we shall therefrom deduce that it is the duty of man constantly to surround these frail and delicate creatures with special care and attention, if he wishes to prevent their being decimated from time to time, and if he would likewise avoid the consequent injuries to himself—the loss of health and money accruing from this deterioration.

So long as the herbivorous or grass-eating animal is properly fed; so long as he browses on fat pastures; so long as his blood retains those physiological elements which are the prime condition of health, he can, and does, resist the causes of most contagious maladies. But if a hot summer and a long continuance of dry weather chance to curtail, in temperate zones, the usual abundance of his fodder, then comes the fatal change: the blood is impoverished, the secretions are debilitated, a strange languor runs through the system, the vital resistance is unnerved, and he becomes an easy prey to those noxious influences which were encountered before without injury whilst his provision was abundant.

This is a fundamental matter. We therefore beg leave to support and justify our argument by borrowing some additional evidence from prior labours of ours, accomplished at the Ecole d'Alfort, near Paris, conjointly with Professor Delafond, whose name has so often been cited in the public journals in connexion with the cattle plague.

All vegetables and animals, with the exception of *adult* men, whenever their health de-

clines from any cause (but more particularly from paucity of food), spontaneously generate microscopic parasites, or very minute insects, the germs of which are inherent in their system. A flock of fleecy animals, wasted by deficient food in dry and parched meadows, becomes attacked in due time by a parasitical cutaneous disease, known as the *itch*, which is enough, if not checked, to destroy the whole. Now, all that is required is to remove this flock to a more fertile soil, where there is plenty to feed them, and the disease will disappear of itself without any treatment. Deficiency of food destroys the health of animals, and abundance of food overcomes disease in them.

A sheep affected by this parasitical disease may, without any fear, be placed in a flock of healthy sheep, for he will not propagate the distemper; but if instead of being sound and healthy, the flock is in a weak declining state, this contaminated animal will diffuse the disease with frightful rapidity, and may cause their entire destruction. These facts may seem startling, but we are only speaking after the incontestable authority of experiments.

We selected six healthy sheep, which we kept well supplied with provisions; we covered these healthy sheep with parasites (acari). On every one of these sound, well-fed sheep, the microscopic animalculæ died off without generating the cutaneous disease; for the blood, the humours, and the skin of sound and healthy sheep constitute a soil unfavourable to the propagation of these parasites, and actually starve them to death.

After this first experiment, we subjected these six sheep to a deficient diet; they grew lean, their blood was impoverished, and then all we had to do was to lay upon them not thousands and thousands of these parasites—as we had done in the first instance—but one solitary female in a state of fecundity; and the parasitical distemper unfolded itself so fiercely as to cause the death of three of these sheep on which the test was allowed to run its course; whilst the other three sheep, having been restored in time to a recoverable condition just as they were about to drop off, were thoroughly cured, without any special treatment, by the sole influence of good food and ordinary hygienic attention.

Other tests, similar to these experiments, were applied to dogs, horses, and horned cattle. A lean and scraggy dog, covered with parasites and eruptions, with eyes running foul humour, a dog which could neither run nor stand, and which was reduced to the last stage of wasting marasmus, was rescued from the jaws of death and thoroughly cured without special treatment, by the sole influence of a rich restorative diet. This dog afterwards became a fine hunting hound, beautiful in shape, and admirable for his sportive attributes.

These experiments having been submitted to the judgment of the Académie des Sciences in Paris, were honoured with its approval, and the reports concerning them were printed at the Academy's expense, and crowned at the competitive examination.

The vital resistance of horned cattle is so feeble, that those animals which are periodically exhibited in the north of London, though certainly chosen from among the most healthy and robust, could not herd together in large numbers for the space of a month in the Agricultural Hall at Islington, without sinking under infectious and contagious diseases

—almost one and all. Under the conditions in which we see them in that Show, a single month would be sufficient to produce almost their complete destruction; for even a single week, which is the usual duration of their confinement, affects them so much as to render a large proportion of them unhealthy.

Every one knows how apt cavalry horses are to sicken and die off during a campaign. Every one has heard of the fearful ravages amongst the horses of the Allied armies during the Crimean war, when many companies were dismounted owing to this mortality.

Let us now transport ourselves in thought into the middle of those immense steppes where vast and innumerable herds of herbivorous animals are being bred for our supply, and consider what will be the effects on their health and life if they should be afflicted with a scarcity of forage, in consequence of this long dry summer.

It is unnecessary to say that there exist in Russia, in Hungary, in Australia, in North and South America, and in many other parts of the globe, large tracts of country which are still uninhabited, whose uncultivated soil sup-

plies with food great numbers of sheep and cattle. These spacious tracts, known as moorlands or steppes, particularly abound in Russia, on the banks of the Wolga, the Don, the Dnieper; in Hungary, on the banks of the Danube; and also in South America, in the republics of Venezuela, New Granada, Columbia, &c.

Now, in hot and rainy seasons these steppes teem with rich and luxuriant verdure; the plants growing up in the marshes are prolific and abundant, and even those parts of the wild moors which produce nothing but heath are capable of feeding and fattening flocks and herds.

Under conditions so auspicious as these, animals may still suffer, but in what way? By excess of food, or repletion. They are in general robust and healthy, and thus fortified they inhale without detriment the deleterious gases of oxygen with carbon, carburetted hydrogen and the like, exhaled by the plants which grow out of the swampy soils. Thus protected, too, they are proof against the fluctuations of the seasons, and against every injury which threatens them; and their strong and sound

condition enables them to sustain the fatigues of their long and arduous journeys, and to supply the rich countries of the West with their flesh, fleece, and hides.

When the seasons have thus conveyed a due proportion of heat, water, and electricity to the elements of the soil, both plants and animals conduce to the comfort and health of man, and fulfil his expectations. But the laws of nature are involved in mystery. Good and evil go hand in hand—death and life travel close together—and a few years of prosperous harvests are almost invariably followed by blight, barrenness, and scarcity. Most men think only of the present time, and this imprudence and want of foresight prevent farmers and great cattle proprietors from collecting and holding in reserve the requisite stores of sustenance to supply their sheep and oxen during these barren seasons. Sickness then breaks out, and these helpless creatures perish in vast numbers, to the detriment of their owners' best interests.

And truly, when continual rains cause the rivers to overflow, when the plains are drenched and soaked, or when a burning sun scorches

the ground, herbivorous animals wander in vain from field to field in quest of sustenance to restore their strength, or of pure and healthy water to slake their thirst; their vital resistance dwindles away, deleterious gases poison and bewilder them, their blood is debased, and as Ovid says,

“Corpora fœda jacent, vitiantur odoribus herbæ.”

And since these mild and harmless animals, which seem to have been created merely to clothe us, and to nourish us with their milk and flesh, have not been endowed by nature either with the intelligence, or the activity, or the cunning, or the invention, or the skill bestowed on the omnivorous and carnivorous species, hard is their fate under the pressing needs of hunger. Peaceful creatures, they browse in vain on deleterious plants on a sterile soil; their external and internal teguments now afford a favourable seat for the propagation of parasites—for the *parasitogenia*; and soon after a general *adynamia*, or relaxation of the fibres, delivers them up without resistance to the morbid elements of the infectious diseases to which they are

exposed, where the languishing, the sick, and the rotting are herded together, and they are carried off by hecatombs by this wasteful and devouring typhus.

II.

We may readily conclude, from these general observations on infectious and contagious diseases, that they must have existed in all former ages; and if in our present advanced state of civilization they are so destructive, we may be sure that in those remote periods they must have been, both as regards man as well as the brute creation, the cause of general extermination, in whatever parts of the earth they prevailed. And indeed, whenever we refer to ancient or modern history, we are continually struck with the analogy which exists between the epidemic diseases signalized by the general name of PLAGUE, and which decimated all the living beings, and those which more recently, and at the present moment, have startled the world by their fatal effects on men and animals.

Moreover, we cannot too often repeat the fact—in order that those documents relating to

the past which contain useful instruction may be examined and searched into—that the physiological and pathological laws which rule and determine the phenomena of organic matter, whether in health or sickness, were, like the laws of chemistry, electricity, and astronomy, originally established at the time of creation, and that matter submits with passive obedience to the laws of transformation and transubstantiation, which are the absolute condition of life. These are the eternal laws of which a synthesis so admirable is furnished by the Gospel, in this short injunction, “*Take, eat, this is my body ; drink, this is my blood.*”

Now, if man, who is the sovereign master of this matter, did not take care to regulate and modify it for his own benefit and the benefit of all living creatures on whom his own life depends, as well as his wealth and happiness ; if he did not seek thereby continually to diminish the sum of evil, and to extend the sum of good which it is his mission to increase, he would violate these laws, which are inherent in matter, and which have existed for his use since the creation of the world.

We must likewise believe that those PLAGUES which are spoken of in the Bible, those which Homer alludes to, that which is related by Plutarch, and which succeeded the general drought in 753 before Christ; those mentioned by Titus Livius, Virgil, Ovid, and other Latin authors, the most virulent of which plagues raged in the years 310, 212, and 178 of the Foundation of Rome, resembled the epidemics or plagues which are witnessed in our own day.

The plague of 212 swept away all the inhabitants of Sicily, cattle as well as men; that of 178 destroyed all the priests, who sought in vain for victims free from the contagion, to offer them up as sacrifices to the offended Gods.

Cecilius Severus gives a most striking description of a pestilential disease which, in 376 A.D., swept away all the cattle in Europe. Judging from his account of that scourge, we may fairly believe that the distemper he has described was identically the same as the one which has just broken out in England. "A universal distaste, sudden dejection, vertigoes, spasmodic tension in the limbs, *a painful*

swelling of the lower belly, violent affections of the nerves, sudden death—everything shows the presence of a pestilential ferment, which irritates the solids, infects and vitiates the fluids, which is the cause of the putrefaction of the humours, manifested by the swelling of the lower belly, which in that case depends on a putrid fermentation so as to disengage air.”

A piece of iron, representing the sign of the Cross, was heated in the fire, and when red-hot was applied to the forehead of the sick animals; and this remedy was looked upon at that time as the most effectual they could apply.

Grégoire de Tours makes mention of an epidemic, the result of a long dry summer, which, in 592, was very fatal in its havoc, sparing no living creature whatever.

André Duchesne, in his “History of England,” speaks of an epidemic which, in 1316, during the reign of Edward II., owed its origin, on the contrary, to a long season of rains.

The celebrated physicians Ramazzini and Lancisi relate that in 1711, an ox which had been imported from Hungary, that constant

focus of typhus, displayed the most deadly form of the cattle disease, in the Venetian territory, although no alteration in the air or waters had been observed in Italy, and the seasons had been regular and the pastures abundant. The contagion spread into Piedmont, where it carried off 70,000 head of cattle; thence it extended to France and Holland, each of which countries lost 200,000 of these animals. The trade in hides introduced the distemper into England, where it proved no less fatal. It was the same in the other countries of Europe.

In this disease, the intestines of the affected cattle were, as in the present epizootia, inflamed, and strewed over with livid spots and ulcerations, and the blood, though apparently fluid in the body of the animal, *coagulated directly after it had issued from the vein.*

Herment thence concludes, that this epizootia is nothing more than an inflammation of the blood. Lancisi advised his contemporaries to put to death without pity every animal which was affected or seemed to be affected with the disease; and it was in

England that this spirited resolve was first acted upon.

The three counties of Middlesex, Essex, and Surrey arrested the course of this contagion in less than three months, by adopting this measure; whilst in the rest of the stricken counties of Great Britain, and likewise in Holland, where this decisive course was not taken at all, the disease prevailed among the cattle for several years. Since that time, it has been insisted on by some authors, that the barbarous process of general extermination offers the most effectual remedy which, in our present state of ignorance and improvidence, we could have recourse to, in order to check the diffusion and the duration of this fell disease.

The learned Goelicke describes an epizootia which was witnessed in 1730, at Frankfort-on-the-Oder. His narrative, written with a masterly hand, might very properly be applied to the disease which we are now considering; and the treatment recommended by this earnest and vigilant observer is so wisely deduced from the symptoms, that even in the present day we might take that treatment as a model.

We could have borrowed much more largely from this source of biographical researches had we not deemed that these quotations would be sufficient for the purpose we had in view in this work. But from these authorities we think it may justly be concluded, that infectious and contagious diseases among horned cattle have frequently appeared from the remotest times down to the middle of the eighteenth century.

All these attacks of epizootia were a frequent and severe cause of suffering and misery among animals and men; but the ravages which they left behind them were of slight importance each time, if we compare them with those attending the epizootia which towards the year 1746 affected the animal kingdom. This dreadful scourge lasted ten years, and swept away nearly the whole race of horned cattle throughout Europe. It was closely studied and thoroughly understood in its causes, its symptoms, and its treatment by the scientific authors of that day, and those writers, more judicious than we, did not designate the malady by the title of PLAGUE. This particular visitation deserves to fix our attention in an

especial manner, not only on account of its striking resemblance to the disease which now makes us all so anxious, but because it induced two English physicians, Malcolm Flemming and Peter Layard, to write on this disease two accounts or statements which are equal, if not superior, to all the volumes which have since appeared on the subject of the Cattle Disease. There is no help for it, and our pride must bend itself to the acknowledgment: these two men, our seniors by a century, were men of quite another stamp. Their expositions, enriched with quotations from the Greek and Latin authors, abounding in facts, ingenious insights and inferences, are far superior in merit to the multitude of voluminous works which have been written and published since then. It would be easy to prove that these two sagacious inquirers far better understood than we have done the real nature of this cattle disease, and that we must be grateful to them for first opening the way which all of us must take in order to discover the preventive and curative means of which we are still ignorant.

Let us observe, in passing, that these two

physicians, who appear to have been scarcely known, enlightened by the effects of the inoculation of small-pox, then practised from man to man, appear to have first conceived the idea, now practised in Russia, of preventing the propagation of the contagious cattle disease by means of inoculation; and we may raise the interest of this remark by reminding the reader that their experiments to inoculate cattle were made in 1757, eight years after the very year which gave birth to the future inoculation of man with animal virus by the celebrated Jenner. By this it would appear that the twofold honour of applying the method of inoculation as both preventive and curative means in respect of contagion in cattle, and as the preventive means by the variola of the cow to resist the ravages of the small-pox in man, is the indisputable claim of English physicians.*

* To assist the researches of other inquirers on this vital subject, now so generally interesting, we may add, that the cattle treatises already referred to—of Malcolm Flemming and Peter Layard—are to be found in the Library of the British Museum, bound together in a single volume, which is certainly worth ten times its weight in gold. It contains, indeed, eight different

opuscula, all relating to cattle complaints, which scientific students may consult with real gratification. I will here transcribe the titles of the most important of these treatises, the pregnant expositions of the two English physicians above-named.

That of Malcolm Flemming :

"A Proposal, in order to Diminish the Progress of the Distemper among the Horned Cattle, supported by Facts. London, 1755."

That of Peter Layard :

"An Essay on the Nature, Cause, and Cure of the Contagious Distemper among the Horned Cattle in these Kingdoms. London, 1757."

A great many accounts, treatises, and expositions on the same subject appeared at the same time in France, Holland, Denmark, and Switzerland. One, which appeared in the last of these countries, is entitled :

"Reflexions sur la Maladie du Gros Bétail, par la Société des Médecins de Genève. 1756."

III.

Very little is known of the origin or first outbreak of the epizootia which produced such fearful ravages in the middle of the eighteenth century. Some suppose that it first appeared in Tartary, where it occasioned a disorder twice as extensive in its pernicious effects as any similar distemper which had been known up to that time. Thence it passed into Russia, from which it spread on one side into Poland, Livonia, Prussia, Pomerania, and Holland, and from that country into England; on the other side towards the East, it invaded the Turkish Empire, Bohemia, Hungary, Dalmatia, Austria, Moravia, Styria, the Gulf of Venice, Italy, Spain, Portugal, France, the banks of the Rhine, and Denmark.

But another opinion has assigned Bohemia as the source from which this destructive epizootia took its rise, and its supporters allege that during the siege of Prague the cattle feeding in its plains had been deprived of their usual fodder by the continual *razzias* of the French to supply their own cavalry.

Be this as it may, this virulent cattle

disease having at length assumed the proportions of a public calamity, the several governments were obliged to take it into serious consideration, and the medical faculties and most celebrated physicians began to make it the subject of their studies and reports. In France, therefore, the professors of the faculty of Paris and Montpellier, suspending every other pursuit, devoted their most assiduous care and attention to dumb animals.

Sauvages, the Dean of the Faculty at Montpellier, drew up a most philosophical and learned account of the prevailing disease, in which, like Stahl, he forgot probably for a moment the part which, in the progress of distempers, he ascribes to the soul.

The professors of Paris, very famous in their day, but who, having left behind them no works so valuable as the "Nosologia" of Sauvages, are now completely forgotten, likewise addressed the result of their inquiries and lucubrations to the King.

Doctor Leclerc was sent into Holland, whence he brought back a Memorial, which was a reflex of the opinions he found current in Denmark, and which has been transmitted

to us in the *Memorials of the Royal Society of Science at Copenhagen*.

It is evident from the reflections found in the writings of Malcolm Flemming, Layard, and other competent observers, that this formidable epizootia was in its character identical with the one described by Ramazzini and Laneisi in 1711; and we feel warranted in saying, after having examined every work of any importance which has treated of that visitation, that it resembles the disease now prevailing among cattle, in its march, in its symptoms, and in its gravity. We believe that these three visitations constitute but one and the same malady, occurring at three different periods. This appears to us a most important fact, for if such be the case, the tentative treatment of that time deserves our most particular attention. Consequently, a few retrospective glances may perhaps be permitted us, in considering the subject of cattle disease.

The medical professors (including several English physicians), who observed and described the epizootia of 1745, divided the same into three periods.

The duration of the disease, when it passed through all its phases up to the death of the affected animal, consisting of from ten to twelve days, they usually ascribed to each of these periods or stages an average continuance of three or four days.

1st Period.—After a few days of latent incubation, which the observer could not suspect, the sick animal betrayed signs of the morbid state which was about to declare itself, by his careless feeding, by drooping his head, and by exhibiting the deepest dejection of spirits in his attitude and look. Rumination, already imperfect, soon ceased altogether, the appetite failed, the horns, ears, and hoofs were cold, the hair grew stiff, the tongue and mucus looked white; the eyes were tearful and fixed, the hearing obtuse, whilst, in the cows, the supply of milk diminished. In cases of unusual gravity, transient shiverings testified to a serious disturbance in all the animal functions. These shiverings were followed by a violent fever, the blood became inflamed, the breath hot, the respiration hurried and sometimes attended with slight coughing; when, if too violent a repercussion was transmitted to

the nervous centres, the pressure on the vertebral line became intolerable, and the animal, seized with vertigo, and almost delirious with pain, would fall during this first period, as if struck by lightning.

The same phenomena are sometimes observed in the typhoid fever of man, which offers moreover some analogy with the contagious typhus of the ox; but as the ox and the horse have likewise the real typhus fever, they may some day supply us with the preventive virus for that fever, in the same manner as the cow now supplies us with the preventive virus for the small-pox.

2nd Period.—In most cases the disease pursued its course with greater or less regularity; the sick animal experienced gnawing pains or twitchings, and spasmodic shootings in the limbs, apparently attended with pain. His thirst was insatiable, but he had no appetite, the functions of the bladder and intestines were impeded, then diarrhoea supervened, accompanied with dry, fetid, and sometimes bloody excreta. Thick viscid mucosities dripped from the nostrils, mouth, and eyes. The dorsal regions and the loins were con-

stantly aching, headache and sleeplessness were permanent. The animal continued either standing or lying down, and if he wanted to rest, he could not bend himself gradually, but would fall like an inert mass to the ground.

3rd Period.—Diarrhoea was continual, becoming more fetid every day, the wasting of flesh made rapid strides; the cellular tissue beneath the hide was filled with gas along the vertebral channels and under the abdomen; the nostrils were stopped up with mucosities, the animal could only breathe through the mouth, puffing and blowing aloud as he drew in the air; and at last pustular eruptions showed themselves on various parts; but as this depurating crisis was insufficient, the poor beast, in this final period of the attack, fell a sacrifice to it between the seventh and twelfth day. If he chanced to be lying down his agony was slow, but if standing, he would sink upon himself, and expire at once.

In this dreadful epizootia, very few of the smitten cattle survived—not more than four or five in a hundred; and in these favourable cases, the symptoms presented certain signs and critical phenomena of a happy omen. In

these rare exceptions, the pulse did not exceed seventy, the beatings of the heart were always perceptible, the patient did not refuse to drink, the continuous fever exhibited no aggravation at night, pustular eruptions and tumours appeared on the dewlap and the fore limbs, and the epidermis over the mouth and nostrils peeled off about the twelfth day.

When dissected, the bodies offered to view the following alterations, the same having already been observed by Frascator during the prevalence of the epizootia in 1514, and by Lancisi and Ramazzini during that which was so fatal in 1711. The mucous glands of the mouth were livid, and occasionally excoriated; the bronchial tubes were obstructed with mucosities; the lungs, besides being partially congested, were sometimes emphysematous, that is, inflated with compressed air. Of the four stomachs, the rumen was full of food, the reticulum, the omasum, and the abomasum exhibited purple or livid spots, according to their place. The thin intestine and the thick intestine showed either a general injection, scattered livid spots, or ulcerations, according as the fever had worn the exanthematous or typhoid form;

for the mucous membrane of the digestive channels, and especially that of the intestines, displays, like the external tegument in man and the brute creation, divers forms of inflammation, analogous with the measles, the scarlatina, and the small-pox; so that, if the typhoid fever in man, which is nothing else than the small-pox of the intestines, is so frequently cured, it is because the general morbid condition, the fever, often conceals different intestinal lesions, albeit they seem to be similar in the general symptoms, which taken collectively constitute the disease.

The flesh of these diseased animals was blackish, and devoid of blood; the animals which fed upon it, if uncooked, sickened afterwards, or died. The wrecks of the bodies, and more particularly the skin, sometimes retained a strength of contagion so deadly, that the mere exportation of them was enough to cause its propagation, and to this cause was at that time attributed the outbreak of the contagion in England.

An extraordinary case of this pernicious influence, which is related by Hartmann, who observed this epizootia at its decline in 1756,

will give an idea of the subtlety of this malignant virus.

A farmer who had lost an ox in consequence of that virulent distemper, buried it in one of his fields. The following night a bear smelt the ox, raked it up with his feet, ate a portion of the flesh, and a few days after, the beast of prey was found dead in a neighbouring wood by a peasant in the parish of Eumaki. The skin belonging to this bear was magnificent. The peasant flayed the animal and carried home his skin in triumph. But his triumph was short; for that same night the poor countryman fell ill, and died two days after the attack. The magistrates of Wiburg, having heard of this occurrence, sent orders to have the infected skin burned. Meanwhile, the skin had been given to the curate of the place as a compensation for the offices of burial; but his cupidity having persuaded him that this fine skin could not have destroyed the peasant whom he had just buried, he did not burn it at all, but induced another peasant to clean and dress it for him. This simple fellow and two other clodpoles, who assisted him in the preparation, fell ill,

and all three of them died in the course of a few days. A new and peremptory order now came from Wiburg to burn this skin, to burn the house in which it had been dressed, to burn even the presbytery itself, should it be deemed necessary. The skin had already passed through several hands. However, the curate being still reluctant to part with it, took it home again. "Can it be possible," said he to himself, "that this skin has really proved fatal to life? What can have been the cause, I wonder?" At the same time he rubbed it in his hands and smelt it. Unlucky curate! A few days afterwards he himself was taken ill and died. (*Memoirs of the Academy of Stockholm.*)

A native of Clermont Ferrand, in the department of Puy de Dôme, in France, the birth-place of Pascal, one day finding an ox which had died of the epizootia, stripped off the skin and carried it away. After his return home, the black typhus, and then gangrene, broke out on one of his arms, which had to be cut off, and the patient died of the effects of the amputation.

A butcher having slaughtered an ox smitten

with this typhus, sold the flesh for meat to some soldiers of the Regiment Royal Bavière, then garrisoned in one of the towns of Languedoc. All those who partook of this meat were seized with diarrhœa, dysentery, and fever, and several of the sick soldiers very nearly died. The butcher, whose avarice had caused all this mischief, had richly deserved some exemplary punishment, and some of the sufferers proposed that he should be hanged outright, but the majority, more clement, sentenced him to be beaten black and blue with horsewhips.

The popular saying, *when the beast is dead the poison is dead*, being generally true, the virulence of the contagion, in the above instances, possessed venomous properties of an exceptional character, for if every sick animal slaughtered by the butchers and sold to the consumers, or those which had been flayed for the sake of the skin, had contained so murderous a virus in their tissues, the number of victims to the contagion among the human species would have been appalling. And in that case, too, similar sacrifices would be witnessed at present, for it cannot be doubted

that, in the actual state of the meat market in London, the people are now in the daily habit of eating the flesh of cattle which are diseased.

IV.

Physicians of different countries have naturally bestowed much time and care in considering and discussing the nature of this epizootia, because they have felt that a satisfactory theory and appreciation of its principal phenomena, might afford the medical faculty a rational basis for some special treatment.

Layard and the physicians of Geneva have considered this cattle disease to be *a malignant fever with an eruptive tendency*.

In the estimation of the faculties of Paris and Montpellier, this cattle disease, considered in its symptoms, was nothing more than *a malignant fever essentially contagious*, the action of which appeared to tend exclusively towards the skin, and therefore it was rational to provoke external eruptions and deposits which, as they matured, diverted from the centre the greatest part of the morbid matter.

The treatment, to which, above all, we invite the reader's attention (more particularly that of medical men), necessarily varied according to the period of the disease. It was sometimes preservative, sometimes curative, as the case might be.

The Preventive Treatment.—The farmers and cattle-breeders, whose herds were still exempt from the contagion, mindful of the advice which they received through the public press, took very particular care of their cattle during this season of epizootia: they rubbed them over with a brush, and washed them at least once a day; they sheltered them from the inclemency of wind and rain; they took their milch cows, which until then they had kept shut up in unhealthy cow-houses, into the open air of the fields; they washed and fumigated the stables; they examined the quality of the fodder and of the other articles of food; they added marine salt to their drinking water, or poured salt water over their forage; and above all, they took care that no foreign animal commingled with their flocks and herds.

Some physicians, on their side conscious of the duty which devolves upon them in such

seasons of calamity, instead of resting satisfied with recommending remedies, betook themselves boldly to the work, and studied the disease experimentally in respect to its propagation and prevention.

Thus, for instance, certain Dutch physicians, in 1754, wishing to know whether the morbid matter would transmit the disease by inoculation, made incisions in the necks of some oxen, cows and calves, inserting in the wound a little tow saturated with the morbid secretions discharged from the eyes and nostrils. This direct inoculation having been practised on seventeen animals, transmitted the disease to them all in the course of a few days.

The English physicians having been made acquainted with these experiments, applied them to a more practical purpose, no longer to discover whether the disease could thus be transmitted (for that had been proved), but to find out (what was far more important) whether this fearful distemper could be prevented and kept off.

Malcolm Flemming, in 1755, merely suggested the idea of inoculation as a preventive means, without proceeding to a course of ex-

periments to ratify his opinion. He intimates his notion in the following terms:—

“I apprehend that inoculation will stand the better chance of bringing on the distemper, if the subject it is performed on is as young as safety will permit, the vessels being then most absorbent, and the animal economy most easily put into disorder.

“But even in case the inoculation of calves should be found so successful as universally to prevail, the method I recommend will not be altogether useless; for, by being properly modelled and adapted to circumstances, it may, I am persuaded, prevent contagion, and likewise act as a preparative in any epidemical affection of the inflammatory kind, not only in horned cattle, but likewise in all other quadrupeds that civil society may think worthy of preservation, and even in the human species.”

Layard, in 1757, devotes the seventh chapter of his work, “The Means to prevent the Infection,” to the consideration of the preventive treatment, in which he says:—

“No one will think of bringing the infection into any place free from it, merely for the sake of inoculating their cattle; but if the

contagious distemper be in the neighbourhood of a herd, or break out so as to endanger the stock, the grazier or farmer may, by inoculating his cattle, with proper precautions, at least secure his stock, since he can house them before they fall sick, prepare them, and have due care taken, knowing the course of the distemper.

“Sir William St. Quintin, the Rev. Dr. Fountayne, Dean of York, and other gentlemen have succeeded in inoculation: in Holland it has both failed and succeeded. These gentlemen all inoculated with matter taken from the running of the mouth, nose, or eyes. Professor Swenke mentions that the beast from which he took the matter was recovering from the distemper. A circumstance to be attended to is this:—had matter been taken after the crisis, from a tumour, boil, pimple, or scab, either on the back near the spine, or on the legs, the pus would have proved much more elaborated, subtle, and infecting than that which, flowing with the mucus of the nose, must necessarily be, in some degree, sheathed by this glutinous excretion, though I am well aware how putrid and acrid it is rendered by the disease.

“That nothing may be omitted which in any shape can contribute to the success of inoculation, due attention should be paid to the constitution and state of the beast, no less in this practice on the cattle than on the human species. Undoubtedly the young, healthy, and strong bid fairer for a good issue than the old, sickly, and feeble; each of these different constitutions demand a particular treatment, even in the method of preparation; and however trifling it may seem to many—the urging a necessity of preparation—I will venture to affirm that I have seen excellent effects arising from a rational preparation, and fatal events from want of preparation. I have likewise been witness of unfavourable turns, merely from an injudicious preparation.

“The beasts which are sanguine require moderate bleeding; those that have but a small share of blood must have none drawn. The strong must, besides moderate bleeding and purging, be kept on light diet, and their body kept open. Thus, scalded bran, mixed with their hay and chaff, will cool them. The weakly, and such as are inclined to scour, must

be kept on dry fodder, and have peas and beans given them to strengthen them. A mess of malt, or a quart of warm ale, with a few spices, will be very suitable for them.

“Whatever diseases the cattle may be affected with, if time will permit, they are first to be removed.

“The cattle to be inoculated are first to be well washed, rubbed dry, and then curried, to remove all the filth from the hair and skin. Then they are to be placed in a spacious barn or stable, where the air is temperate and no cold can come to them. There they are to be prepared according to the direction already given, foddered with good sweet hay, and watered with clear spring water; and if the distemper be not near, they may be turned out into the air, near the barn or stable, and may stay there a few hours in the middle of the day.

“When it appears that the cattle are in perfect health, free from any infection or disease, brisk and lively, neither costive nor scouring, and chewing their cud, then the operation may be safely undertaken, and henceforth they must be confined to the barn.

“ Since there is observed to follow the greatest flow of the contagious and putrid particles separated from the blood, wherever the infectious matter makes an impression at first, particular care must be taken not to inoculate near such vital parts as the heart and lungs, nor near the womb, if a cow with calf be inoculated; for, though rowels are properly applied in the dewlaps to draw off the pestilential humour from the breast, and in other cases beasts are frequently rowelled in the flanks,—yet, in this operation, as matter is inserted by these channels into the neighbouring vessels, those vital parts, or the womb, might become the chief seat of the disease, and the event prove fatal.

“ To prevent such accidents, human beings have been inoculated on the arms and legs, and now-a-days the arms are found sufficient. I would recommend that the cattle should be inoculated about the middle of the shoulders or buttocks, on both sides, to have the benefit of two drains. The skin is to be cut lengthways two inches, deep enough for the blood to start, but not to bleed much. In this incision is to be put a dossil or pledget

of tow, dipped in the matter of a boil full ripe, opened in the back of a young calf recovering from the distemper. It may not be amiss to stitch up the wound, to keep the tow in, and let it remain forty-eight hours. Then the stitches are to be cut, the tow taken out, and the wound dressed with yellow basilicum ointment, or one made with turpentine and yolk of egg, spread on pledgets of tow. These dressings are to be continued during the whole illness, and till after the recovery of the beast, to promote the discharge; and then the wound may be healed with the cerate of lapis calaminaris, or any other.

“On the third day after inoculation, the discolouring of the wound, whose lips appear grey and swollen, will be a sign that the inoculation has succeeded; but the beasts, as Professor Swenke informs us, did not fall ill till the sixth day, which answers exactly to the observations daily made in the inoculating of children. Yet the Professor adds that on the third day a costiveness came on, which was removed by giving each calf three ounces of Epsom salts.

“No sooner do the symptoms of heaviness

and stupidity appear than the beasts must have a light covering thrown over them, and at night fastened loosely. They must be rubbed morning and evening, and curried, till the boils begin to rise; warm hay-water and vinegar-whey must be given plentifully. Should the beasts require more nourishment, dry meat, such as cut hay, with a little bran, may be offered. I should be very cautious in giving milk-pottage, even after the boils and pimples had all come out, for fear of bringing on a scouring. However, this caution is proper, that whenever milk-pottage be given, the vinegar-whey is to be omitted for obvious reasons. In cases of accident, the same attention is to be observed in the disease by inoculation as in the natural way, and the medicines recommended are the same I would use; but by inoculation there seldom is a call for any; so favourably does the distemper proceed through its several stages.

“The crisis being over, it will be proper to purge the cattle, to air them by degrees, and to have the same regard in the management of them as is laid down in the chapter on the method of cure.”

Such are the recommendations which Layard has prescribed for those who have to practise inoculation as a preventive treatment ; it would be difficult to offer an example of greater prudence or precision.

A certain number of oxen were, by means of this inoculation, protected against the attack of the cattle disease ; and this mode of treatment was, as we shall afterwards explain, adopted in Russia. Unfortunately, this rational and preventive treatment was discovered only at the end of the epizootia, when already upwards of six millions of horned cattle had fallen a sacrifice to the contagious fever.

Curative Means.—When the first course of the disease had left no doubt of the attack, the sick animal was subjected to an appropriate diet, and restricted to liquids either as medicinal decoctions, or as alimentary beverages. The decoctions consisted of whey mixed with a little vinegar, and nitred hay. The broths, or alimentary beverages, consisted of a decoction of bread, and of water mixed with bran and meal, whether of barley, oats, or wheat.

At this stage of the curative process, the majority of physicians recommended one or two bleedings, in order to abate the violence of the fever, and of the congestions near the nervous centres and the lungs; and as constipation prevailed at the time, they strove with the same object to empty the digestive passages, the intestines, and the stomachs, notwithstanding the difficulty that exists to produce this result in ruminating animals.

The purgatives employed consisted of a decoction of senna, mixed with prune juice, with a little rhubarb or fresh linseed oil, infused in their drink, or applied as a clyster in warm water slightly salted. Those who practised polypharmacy administered at night a mixture of nitre, camphor, red-lead, and rhubarb, in half a pailful of warm water; and greatly did they boast of the active influence of this beverage.

Some practitioners even endeavoured, in the first stage of the malady, to accelerate its action on the skin by giving for that purpose warm drinks, and by covering the cattle with woollen cloths, to promote perspiration; but it was generally admitted that the sick animals

preferred cold drinks, and that they were particularly fond of acidulated whey.

In the second period of the distemper, the same drinks were continued, adding thereto some theriac or Jesuit's bark, in order to lessen the frequency of the diarrhoeic evacuations. They also provoked the depurating secretions from the mouth, nose, and eyes, by repeated washings; and as those animals, in which the running was most easy and copious, seemed to be less seriously affected with the disease, they strove to increase that which flowed from the glands of the mouth by fixing a gag in the jaws, and keeping it there for several hours. This measure seemed so efficacious that a decree from the Parlement de Rouen, issued on the 13th of March, 1745, ordered the application of a gag, or bit, for three hours every day, to the cattle under treatment.

In the third period, they sought to overcome the wasting of strength in the system by means of tonic and nutritious drinks, decoctions of centaury, Jesuit's bark, juniper berries, &c. They likewise administered emollient clysters if the evacuations were bloody.

Moreover, they placed two or three setons, principally in the dewlap, in order to obey the signs and indications of nature—*quo natura vergit, eo ducendum* ; as a salutary and critical eruption of the skin was at that period forcing its way. These setons were kept open with a mixture of turpentine and yolks of egg, for the purpose of encouraging the secretion. The purulent or emphysematous tumours were cut.

But whatever means might be employed, almost all the cattle perished, and the few and rare recoveries only afforded the pessimists the satisfaction of claiming the merit of them for themselves. It was remarked, besides, that the fattest beasts were the least able to resist the effects of the distemper.

It is hardly necessary to say, that during the whole course of the treatment, great care was taken to keep both the stables and the cattle in a perfect state of cleanliness.

The convalescence of those animals which were cured was invariably long, and required great attention as to their food and hygienic treatment. Solid substances, roots, and forage were withheld until rumination revived ; and it was only after several days of encouraging

trials that the recovered animal was suffered at last to feed all day in the field, according to his pleasure.

Such, then, was that formidable epizootia which, in the middle of the eighteenth century, swept away upwards of six millions of horned cattle, and which occasioned a loss to Europe exceeding fifty millions sterling—perhaps we might say a hundred millions—for other domestic animals, sheep, horses, &c. (as generally happens in cases of epizootia), had likewise suffered, in different degrees, from the various complaints arising from inclement seasons.

It was certainly necessary to our purpose that we should have taken this retrospective view of the cattle disease, and it will afford us a valuable guide for the future. We may now content ourselves with bringing together the different annals in the chain of time which elapsed between Layard's treatise, which was published in 1757, and the present day. This chain of time amounts to 108 years.

V.

The typhus of Horned Cattle, which had shown itself in a manner permanent, sometimes raging at one part of the globe, sometimes at another, could not, under the unaltered conditions by which it had been generated, suspend its ravages; and though, thanks to her isolated position, England may be less exposed to it than other countries, it is, however, necessary to take note of what may serve for our instruction in the several epizootics which will pass under our view.

Medical writers relate that contagious typhus broke out several times in Holland during the years 1768, 1769, and 1770; it also appeared in French Flanders in 1771, in Hainault in 1773. In France one particular spot was, at this period, completely rendered intact by drawing a sanitary fence about its limits, and bestowing on the cattle particular hygienic attention as a safeguard. The stables of these animals were washed, cleansed, and fumigated; spring water was given them to drink, their food was chosen with care, and a certain quantity of salt was mixed with it.

In 1774, Holland, a cold and damp country, was once more invaded by the scourge; and the Government offered in vain a reward of 80,000 florins to any one who should discover the preventive or specific remedy for the disease.

The typhus which, at that epoch, had likewise broken out again in the south of France, threatened to become an abiding peril to the wealth of nations. Two French authors, Vicq d'Azyr and Paulet, betook themselves earnestly to the task of collecting every document which up to that time had been published on the successive visitations of the malady, and of offering the means of preventing it. Their intention was unquestionably laudable, but the time for obtaining such a result had not yet arrived; besides which, these two writers, whatever may have been their desert, were not equal to an achievement of this character. They belonged, indeed, to that order of men who look upon the cultivation of science solely as a step to personal distinction.

Vicq d'Azyr himself was but twenty-five years old when he issued, in 1775, his work,

entitled, "Exposé des Moyens curatifs et preservatifs qui peuvent être employés contre les Maladies des Bêtes à Cornes." We should deceive ourselves if we expected to find in this exposition anything but an interesting compilation of the works already published.

Paulet's treatise appeared likewise in 1775, under the title, "Recherches historiques et physiques sur les Maladies epizootiques, avec les Moyens d'y remédier dans tous les Cas, publiées *par ordre du Roi*." Paris. Two volumes.

After reading and reflecting on this title, as servile as it is arrogant, I might have dispensed with all examination of the work. A scientific man, whilst in the pursuit of truth, takes orders from nobody, not even from kings. Paulet, therefore, writing *by order*, could only produce a work of mediocrity, and such is incontestably the degree of value of his two volumes, forming, as they do, a fastidious dissertation of epizootics in general, and of those relating to cattle in particular.

The works of Paulet and Vicq d'Azyr, written at the same time, not being the labour of men practising the medical art, are on a level as to the notions which they have handed

down to us; but that of Vicq d'Azyr being the better of the two, we shall extract therefrom what may chiefly interest us.

Vicq d'Azyr relates the history of the epizootics, and expatiates on the original cause of the typhus in horned cattle, and on its nature. The passages in which he treats of its mode of propagation and its treatment, are the most deserving of our notice.

He says, that he tried to no purpose to communicate the disease a second time to animals which had been fortunate enough to get cured.

That cows covered with the fresh skins stripped from dead cattle, victims to the distemper, did not contract it.

That infected clothes which had been worn by men who had served in hospitals where cattle were under treatment, having been laid on the backs of several beasts in sound health, were found to transmit the distemper in three cases out of six.

That the gases expelled from the intestines, received into a bladder ball, and let out under the noses of healthy cattle, have communicated the disease to them, after ten or fifteen days

of latent incubation; and that the same gases being mixed with their drink, have also propagated the contagion.

That frictions, with the hands impregnated with virus, having been made over the skin, did not produce any ill effects.

That some oxen which had been designedly placed for a few hours among sick animals, have afterwards been seized with the distemper.

That a calf which had been placed in a stall containing some oxen grievously affected, but which calf had a basket beneath its nose filled with aromatic herbs, withstood the contagion.

That cowsheds which had been partially cleansed and fumigated, transmitted the disease to other cattle, even several months after they had been vacated.

Finally, he mentions the experiments of inoculation made by Layard in England, but not understanding their aim and capacity, he adds, that inoculation does not seem to him of any use, since the inoculated animals all died. Yet he quotes the encouraging results obtained by Camper in Holland, who, out of

112 inoculated cattle, saved 41; and those of Koopman, who, out of 94, cured 45 by this very inoculation.

He reminds us that the cattle typhus is an abiding disease in Hungary and Russia, where the beasts having bad water to drink, can only be protected by a constant use of marine salt (*sel gemme*); but being deprived of this salt, when they go great distances to be sold, and being exposed to extreme fatigue and privations, the typhus then spreads among them. He likewise tells us that Hungary and Dalmatia, which used to supply the markets of Italy with butcher's meat, were obliged to give up sending any cattle there, the Italians having firmly refused to purchase the same at any price whatever.

As regards treatment, the advice which Vicq d'Azyr gives to agriculturists, is mostly borrowed from the authors who have written on the great epizootics of 1711, and 1745 to 1755. Thus, he advises them to give as drinks in the first stage, water whitened with meal and nitred; to purge the animals with linseed oil; even to make scarifications on the skin, and to keep up the suppuration

with turpentine; to make the animals inhale six times a day vapours seasoned with vinegar; to wrap them over with woollen cloths; to bleed them once or twice; to administer to them, when diarrhœa shows itself, a beverage containing wormwood, quinine, and diascordium; to cut open the tumours containing pus or air, etc.

It is, as is seen, the same treatment as that quoted above; he guarantees its success, and supports his views by the authority of Van Swieten and Huxan.

Van Swieten, however, had somewhat modified the treatment, by the predominance which he allowed to acids; and this course seemed to him to be only reasonable with respect to animals whose sick humours contain an excess of alkali.

Vicq d'Azyr fixed his attention on the means of prevention, the most effectual of which, in his opinion, was to slaughter every animal which had either sickened, or had been exposed to the influence of the contagion; and as he insisted that the authorities had no measures to keep in this matter of public interest, he made it a principle that the

government was bound to compensate the cattle proprietors whose animals had to be killed—the more so, said he, that the crafty husbandmen would never come forward and freely declare the invalidity of their cattle, unless some indemnity were held out to them, which they would look upon as a sort of equivalent for the benefits they had expected by cutting them up and selling them as the food of man.

The doctors of the period, scenting in Vicq d'Azyr a dangerous competitor, considered the advice of exterminating the diseased cattle as an *ingenious means of curing* them, and as the author's age and experience gave warrant for this satirical tone of discussion, the public joined them in laughing at him.

The epizootic typhus, if not so destructive, was at least as frequent in the early part of the nineteenth century, as it had been during the eighteenth. The armies during the wars of united Europe against the French Republic and Empire, found it constantly in their train. Nor could it be otherwise, the two leading causes of its prevalence being at hand. For on one hand there was the transit of large

herds from the steppes of Hungary, and on the other the wretched hygienic conditions amidst which the cattle had to live in the campaigning armies.

Many books have been published of late years on the diseases of cattle, in France and Germany; and several distinguished English veterinary surgeons, especially Professor Simonds, have also devoted their attention to the same subject. In the second part of this work, we shall have occasion to refer to their labours.

In France, Renault, Delafond, d'Arboval, Gellé, whose works enjoy a deserved reputation, have discussed the subject of the origin of this disease.

Renault asserts that the disease has but one single focus, the steppes of Russia and Hungary. The epizootics of Asia, Africa, and South America are caused, he considers, by the importation of animals to those countries. It is thus that he explains the epizootia which, under the name of Delombodera, devastated the American Republics in 1832, and that which, in 1841, appeared in Egypt. Renault thinks that neither the long transit, nor the filthy state

of the markets, nor the most wretched feeding, are sufficient to account for contagious typhus among cattle; that in addition to these causes, it still requires, in order to produce and generate it among animals, a predisposition, and a special aptitude, such as, hitherto at least, do not appear to have been witnessed except in the progeny of the steppes.

The other professors of his fraternity have submitted arguments to him, which to us seem very rational; and we will endeavour to do justice to them when we discuss the origin of the typhus which at this moment is afflicting England.

VI.

These historical dissertations and speculations on the subject of the bovine epizootia certainly deserve to draw the attention of all who feel an interest in the malady; but how insignificant they are compared with the concluding facts which I have still to mention, before I at length address myself to the consideration of the epizootia which is now consuming our herds!

The indisputable fact that so terrible a dis-

temper as this typhus had fixed itself permanently in Russia, and that it was causing incalculable losses to the lordly proprietors of the steppes, as well as to the government, roused them at last from their indifference. Then, indeed, they urged the veterinary doctors to adopt some energetic means to arrest the long duration of the scourge, and we must admit to their honour, that various experiments which were tried for the purpose of preventing the evil, have been crowned with complete success. Any one may ascertain the fact by referring to the *Journal Magazin* of Berlin, in which the learned Professor Jessen of Dorpat has explained the results of these important experiments.

The Russian veterinarians having observed that the oxen which had been cured of the typhus could mingle with impunity with the infected herds, conceived the idea of communicating the complaint to sound cattle by means of inoculation, and thereby to shield them from the contagion.

The first experiments in the inoculation of *Tchouma* or cattle typhus, were made in the year 1853, by order of the government, in

the neighbourhood of Odessa, at the Heridin farm, by Professor Jessen.

The first inoculative attempts were very fatal; they caused the death of all the inoculated animals. But it was soon perceived that these grievous results, far from prejudicing the theory, really confirmed it; and that the virus, attenuated in its toxical properties, would prove as effectual as was expected. And truly, in 1854 and 1855, at the Dorpat establishment, the inoculations made with a better selected virus afforded results less disastrous. At Kozau they were still more satisfactory. In fine, passing from experiment to experiment, they arrived at the conclusion that it was necessary to inoculate several heads of cattle, the one after the other, without having recourse to any other virus than the first inoculated, so that they might thereby obtain virus of the 2nd, 3rd, 4th, 5th, and up to the 10th generation. The virus thus attenuated in its morbid effects answered at length every experiment, and oxen thus inoculated could mingle with impunity with diseased cattle.

At the veterinary establishment of Chalkoff

they inoculated, during eight meetings, 1059 animals with virus of the 3rd generation, and the results were as satisfactory as could be wished for, only 60 animals having sunk under the effects of this preventive operation.

The inoculations made in 1857 and 1858 on an estate belonging to the Duchess Helena, at Karlowska, in the government of Pultawa, and conducted by the veterinarian Raussels, likewise afforded the most satisfactory results.

Professor Jessen thinks it certain, that beasts born of cows which have been afflicted with contagious typhus do not contract the disease. He maintains that Europe may be preserved from this frightful scourge, by taking care that no cattle be exported from the steppes of Russia save those which have had the distemper either naturally or by inoculation, and he is striving to propagate this opinion, and to render it practical, by having all the cattle inoculated, without exception.

It is deeply to be regretted that counsels so prudent have not been heeded in the 47 governments which, out of the 53 possessed by Russia, have generated the contagious typhus; for then it would not so frequently

have effected its passage into the neighbouring states, and England most probably, would not now have to take up arms against its fatal extension.

VII.

We here conclude that part of our labour which includes the history of this disease, and what we have been able to glean from those medical writers, and others, who have given us the results of their experience. It may have appeared somewhat protracted, but it has at least laid open to the student the antecedent investigations of our predecessors, under calamities of the same kind, but considerably more fatal than what has yet been witnessed in Western Europe during our time. We have disinterred and brought to light the forgotten works of conscientious and competent men. Like Brunelleschi, the architect, we have sought, not to invent a theory, but to recover a practice; and thus we have received the observations and precious facts, and finally the preventive treatment, of other men and other times, which had coped successfully against the cattle disease when its ravages were infinitely greater.

To resume, then : these inquiries (which we undertook without anticipating so rich a harvest) have proved, and made evident—

That the contagious typhus afflicting horned cattle, has spread its destructive principle over our globe ever since there have been animals living on its surface.

That from century to century, not to say from year to year, it has carried its terrors amidst nations and peoples.

That the remedial measures which had been taken and applied prior to the middle of the eighteenth century, were utterly powerless either to cure this disease or to prevent it.

That at that period appeared two English physicians, men of remarkable aptitude and penetration, one of whom, Malcolm Flemming, laid down in theory the bases of a preventive treatment ; whilst the other, Peter Layard, applied this theory to practice, by inoculating sound and healthy animals with the morbid virus of the typhus, in order to protect them from the fatal effects of the contagion.

That this all-important progress in medical experience, has been absolutely forgotten ; so much so, indeed, that the experiments of in-

oculation, tried in Russia only ten or twelve years ago with perfect success, do not seem to be connected by any link with those made in England a century before, and that the invasion of the so-called CATTLE PLAGUE in 1865 seemed to some men to have introduced a new scourge, which men were not armed and prepared to meet—which they were powerless to cure, or to stay in its progress.

These inquiries, then, have proved, we think, that we are not so helpless as we had imagined to resist the evil. But we cannot help feeling, that we have laid bare in this exposition some most distressing inferences concerning the human mind. For, in truth, can anything be more deplorable, than thus to see the civilized nations of Europe endure, from century to century, these reiterated outbreaks of cattle typhus, and to see likewise that no man of sufficient energy and independence has yet arisen to tell the truth fearlessly to the governments and peoples, however painful that truth may be, and to expose the futility of the measures hitherto employed to arrest the scourge?

And, on the other hand, is it not most

afflicting to see discoveries of indisputable value buried out of view, submerged in public libraries, utterly unknown and forgotten, like their authors, to such a degree, that the distemper which they have made known in its entirety, and which is as old as the world itself, seems to us almost new in 1865?

God send, that these cruel trials and severe lessons which the past has bequeathed to us may teach us something for our benefit! May the irresistible might which is derived from the auspicious union of capital and intelligence supersede the vain and flimsy efforts of isolated energy! May the government, which lavishes hundreds of millions upon the destructive engines of war, devote some portion of its ample means to the study of hereditary infections and contagious diseases! For these fatal epidemics decimate men as well as cattle, and we may at least ward off from our children the desolating disease which at present afflicts ourselves.

We possess already every requisite means to protect ourselves from the formidable visitation of these diseases: we have science; we have the men who cultivate and teach it; we

have the experience of the past added to our own. To-day, we are called upon to resist the baleful effects of cattle typhus ; but another epizootia may come to-morrow, and strike our horses and our sheep—those domestic animals which constitute our most precious possession. The cholera hovers about us. If we do nothing, if we talk and debate instead of acting, these scourges will come upon us on a sudden, and find us quite as helpless as ever to resist their sway.

These palpable truths deserve to be further developed, and will be treated more copiously at the end of this book. They will constitute the complement of our work, necessarily written in haste, since the danger we had to expose was itself so urgent and alarming.

SECOND PART.

THIS Part is divided, as already stated, into four chapters.

CHAPTER I.

On Typhous Diseases in general, and the Typhus which affects the Ox in particular.

By following the example of those authors who have described the contagious typhus of the ox, we might proceed at once to explain its symptoms, and go directly to our purpose; but, by taking this hasty course, we should expose ourselves to be imperfectly understood by the majority of our readers, and to leave certain doubts in the minds of physicians as to the nature of the disease and the propriety of its treatment.

All animals, including man himself, are born with a predisposition and liability to

contract a certain number of contagious febrile diseases; they bear in a manner a certain number of physiological elements, which might be called latent germs, and which, under given conditions, become the leaven of these diseases. This must, indeed, be the case, since after these disorders have been once developed those who have been cured of them are not apt to contract them again, the morbid developments having destroyed that natural aptitude which had previously existed to undergo the morbid action of the contagious virus. These diseases are not numerous; they constitute a very distinct class, and the same laws, which regulate the phenomena in one of them are applicable to all the rest.

These diseases exhibit the following characteristics: 1st, a period of incubation, during which the whole economy, more particularly the blood and humours, experience very important changes and modifications; 2nd, a febrile state, which varies in its continuous or intermittent types, and in its intensity, according to the species of the animals, and which proceeds from the alteration of the blood; 3rd, a revulsion at once toxical and

congestive towards the nervous centre, inducing *stupor*; 4th, a flux of mucus from the mouth and chest; 5th, a more intense, congestive, and inflammatory flux or discharge from the external or internal teguments—the skin or the mucous membrane of the digestive channels; 6th, a period of adynamia and dejection, with a tendency, in some cases, to a critical or salutary rejection of the morbid matter by the development of tumours or abscesses in the skin; 7th, they are at once infectious and contagious, epizootic or epidemic; that is to say, they are transmitted in different degrees by contact, by inoculation, and at a distance by the means of vitiated air; 8th, finally—and this is their leading characteristic—*they are not subject to recurrence*, each individual that has once been affected, losing in general all aptitude to contract the disease a second time.

This last characteristic, when well understood, ought in reason to induce us to have recourse to the preventive treatment, and such has been the case with respect to the most virulent amongst them—small-pox and the typhus of the ox.

Prompted by these principles, which are as logical and fixed as any mathematical deduction, I suggested in 1855 that inoculation should be applied in typhoid fever, which is nothing else but the equivalent of intestinal small-pox, in order to prevent the disease in men. But if the simplest truth sometimes requires a contest of ages before it is heard and understood, I could not hope to fix attention on a fact which might be taken as problematical. I felt that I was outrunning time, and that I should neither be heard nor understood; and so it has proved.

Be that as it may, these typhous diseases have, as is seen, their laws and foreseen development. They attack animals generally, but chiefly herbivorous animals, endowed, as we have shown in the first part, with a vital resistance which is, relatively speaking, very inconsiderable.

These febrile typhous diseases (whether their development is caused by a spontaneous morbid action in the patient or by an evident contagion), have a period of incubation during which the vital strength undergoes latent morbid modifications, though not sufficient to

indicate, save in times of epizootics and epidemics, the particular form which is about to reveal its symptoms in the course of a few days. This period of incubation being over, the mouth and chest become affected, and fever declares itself; and then the *materies morbi*, which is to become the special and dominant characteristic of the distemper, is directed either to the skin, or to the digestive mucous membrane. In the first case, we see evidence of exanthematic diseases, which present only the lightest forms of detersive disorders, such as measles, scarlatina, or that more serious one, from its pustulous form, the small-pox. In the second case, the elimination takes place from the intestinal canal, and then we see produced in animals, as well as in men, the typhous diseases: that is to say, the typhoid fever—a pustulous and ulcerous malady of the intestines—or the common typhus of the hospitals, prisons, and campaigning armies; and again, in animals, there is also the typhus of the steppes, of the marshes, &c.

The Eastern pestilence, the plague of Rome in the age of Antoninus and the plague of Athens, which might have given to Hippo-

crates the right of treating with Artaxerxes as one potentate treats with another, ought perhaps to be classed among those typhuses not subject to recurrence.

As for the *cholera*, it seems to be a contagious and epidemic disorder, of a distinct and particular kind. We are ignorant of its essential cause, its nature, and its mode of treatment; and although it has prevailed in every age, and even frequently of late years, it will always, by reason of the strange formation of our medical institutions, find us as weak and defenceless to resist its attack as we have ever been.

If we have been properly understood, typhous diseases are, above all, general febrile affections. At one time the *materies morbi*, or discharge, affects the skin; at another, the digestive mucous membrane. When it acts upon the skin, as clinical observation shows, there is sometimes a sort of hesitation in the eruptive process; people wonder what disease is coming forth; the eruption wavers in the form it will assume, till at length its real character is determined. The same uncertainty prevails when the intestines are affected.

Sometimes the exanthema is merely the equivalent of simple measles or scarlatina of the intestinal mucous membrane, and many typhoid fevers of short continuance are nothing else in their nature. The same occurs in common typhuses. Sometimes the local affection proceeds as far as pustulous eruption, sometimes only to exanthematic rubefaction; hence the various alterations which we have witnessed in the intestines of cattle killed in our presence at the slaughter-houses of the Metropolitan Market, and which we ourselves dissected. The experienced Professor Bouley, from the Ecole Vétérinaire of Alfort, near Paris, whose visit must have been beneficial to England, clearly recognised in an ox which was slaughtered and dissected at the Metropolitan Market, the genuine pustule of typhoid fever. But in most cases, as we shall show, it is the other forms which prevail.

We make these observations in order to anticipate the objections of those reasoners who, being more influenced and guided by the local facts and by the symptoms, than by the general phenomena of comparative pathology,

might argue that such or such fact is opposed to our doctrine.

In a word, then, typhous diseases have their types; but the living being is subjected to so many different influences, hereditary, idiosyncratic, climatic, hygienic, &c., that by the side of one subject going through the course of morbid phenomena with fatal regularity, another may be seen in which such or such functional derangement is readily distinguished. Thus in some animals, predisposed thereto by prior disorders, the morbid action originally propelled towards the channels of respiration will continue to be most salient; and after dissection the lungs will be congested and emphysematous, and the intestines relatively but scarcely altered. The animal, indeed, though bordering on typhus, will sink under the effect of functional derangement in the breathing passages. In others, by the influence of some particular predisposing cause, disorders of the nervous centres will be signalized; a cerebral and spinal pains will be intolerable, delirium will quickly ensue, and the asphyxiated patient, if a man, will succumb in the course of a few

days; or if an ox, he will be wild and ungovernable, and then fall as if thunderstruck, fastened to his stall. Finally, in other cases, these first two phases of the distemper will not prove fatal, the intestinal injuries will pursue their course, and the affected animals will not die until the third period.

As we have seen, the morbid phenomena may be different, although the affection continues the same; the typhoid fever or the typhus being nevertheless the essential disease which prevails.

These generalities, to some readers, may appear irrelevant, but let them not be mistaken; they have a claim to our notice, and are really important. They show, indeed, that independent of the preventive treatment, which is an absolute rule in the case of virulent, contagious, and non-recurring diseases, the treatment of the disease itself, when it has declared itself, and when it pursues its course, cannot be the same for every patient; and that, moreover, this treatment must vary in the different phases of the disease, as physicians and veterinarians are well aware.

These generalities, likewise, explain the

various diseases—viz., those in which the animals blend together the typhous and exanthematic diseases. The measles and the scarlet fever, affecting the external or internal membranes, are like the first steps of these maladies; they are generally slight, and we have but to watch over the progress of the symptoms, and to assist nature, which, with few exceptions, brings all things to a favourable issue.

These disorders, which are relatively slight and do not provoke in the economy any of those changes which in some sort transform the constitution, are not absolutely proof against relapse. They lead us rationally and by degrees to the more infectious and contagious diseases, to the common typhus; therefore it is unnecessary to apply the preventive treatment to them, that being exclusively reserved for the latter.

Let it then be well understood, that the typhus of the ox, the study of which we are about to enter upon, may vary in its symptoms and post-mortem appearances, without losing thereby the characteristic mark which renders it a thoroughly distinct, and, in the present day, a thoroughly well known distemper.

Now that the reader possesses these general notions of the Contagious Typhus, we shall be able to speak to him in a language which he will understand, and give a definition which he will be able to judge and appreciate.

The typhus of the ox, then, is a *virulent, contagious, febrile, and non-recurring disease, with stupor and derangement of the nervous, respiratory, and digestive functions; leaving various changes in the respective organs of these functions, and chiefly in the intestines.*

This new definition seems to us to be more faithful and just than those hitherto given; and this, if needed, we could demonstrate.

I do not disguise from myself that some of the opinions expressed in these generalities may, at first sight, appear strange and liable to objection. Thus, it may be argued that inoculation as a preventive treatment of typhous maladies is far from being a general law, applicable to every case; since in Russia, for instance, where this inoculation is practised every day, it completely fails in certain foreign herds, and they die of the consequences of the operation; and that this, therefore, might happen in England.

To these objections we would reply, first, as regards the novelty of opinions expressed, that we have taken up the pen, because we had to write something different from what has already been published in known works, otherwise it would have been our duty to remain silent; and secondly, as regards the inefficacy of inoculation, that organic and vital phenomena have their principles and their laws, which are fixed and invincible, from which it is reasonable to deduce consequences and positive rules of conduct, which cannot yield to superannuated opinions or imperfectly executed experiments. To institute experiments indeed under the rigorous conditions of a logical and irrefutable demonstration, is not so easy a matter as may generally be thought.

For our part, the principles deduced from strict observation are the basis on which we build, and if it so chance that we are baffled in our experiments we vary them indefinitely; and if still we are deceived in our hopes, we ascribe the miscarriage to our impotence, to inadequate means; and to the defective instruments which the physical and chemical sciences, still in their cradle as regards organic matter,

supply for our use. Above all, we wish it to be remembered—" *Scribo nec ficta, nec picta, sed quæ ratio, sensus, et experientia docent.*"

CHAPTER II.

The Origin and Causes of the Ox Typhus.

I.

I have drawn my conclusions as to the preventive treatment of typhus in the ox, from the knowledge I had acquired of its morbid phenomena, its nature, and its non-recurrence; and it is a logical deduction quite as accurate as could be the result of a syllogism. The study of the origin of this typhus, and of the causes by which it is generated and spread abroad, will supply us with additional arguments to sustain this deduction, as well as those signs and indications which are the very foundation of curative treatment. The description of the disease will contribute to the same result; for the rational treatment of a distemper can be derived only from a knowledge of all the phenomena which occasion it,

of the functional derangements, and of the alterations observed in bodies after death.

I wish particularly to say at once, in entering upon the subject of etiology, that the special works which treat of it contain precise information as to the causes and origin of the typhus in horned cattle; and that the chief organs of the press in every country—those ephemeral encyclopædias in which unfortunately so much vital force and intelligence are dissipated—have published articles of the highest interest on this subject. It would be physically impossible for me to begin again a bibliographical labour similar to the one exhibited in the First Part, in order to afford due justice to each of these public writers, who have met the epizootia on the confines of their country and fought hand to hand with it. This work is not susceptible of so much enlargement. Let it be well understood, that I claim no other merit than that of discussing these questions of etiology, in that order and with that common sense which fix ideas firmly in the mind—which, if I may use the term, *photograph* them on those parts of the brain allotted to the memory and judgment; also of

drawing from known and admitted facts more rational and practical conclusions than those which have been current up to the present time.

Much has been already said and argued on the origin of the contagious typhus which affects the ox; some adhering exclusively to the special conditions observable in the breed of those oxen which are reared and fed on the steppes of Russia and Hungary; others, more reasonably, as it seems to us, ascribing it to the hygienic conditions generally, that is to say, to the climate, the season, the feeding, &c., &c., amidst which these animals are living.

All these discussions upon what has been said and argued on this subject have been very useful. For, had it been rigidly proved that the oxen of the steppes, by some peculiar organization, carry within them those germs or physiological elements which at given times become the leaven of the distemper, and, at a subsequent period, the elements of the contagion, then, indeed, a fact of capital importance and prominent authority would have been established, and the attention of all men interested in these inquiries would have been

exclusively concentrated on that particular race of animals and on those countries smitten with the curse, in order to arrest and confine the disease within its one and only focus.

The supporters of this theory, concerning the first circumscribed origin of the typhus, maintain that all the epizootics whose deplorable history we have given in the first part of this work, have had no other generative causes than the propagation of the complaint, born and begotten on the banks of the Wolga and the Danube, and subsequently conveyed to the different parts of the earth by the emigration of the cattle. And in this manner, too, they have accounted for the appearance of the typhus in South America, in Africa, and in Asia.

Since this doctrine on the origin of the typhus has been conceived and maintained by men of a high order of understanding, we must suppose that they had been struck and convinced by important facts and serious reasons; and as it would be unfair to oppose a plain denial to an opinion now so generally adopted, we are bound to say in what manner these authors justify their views, after which we shall endeavour to refute them.

The partisans of the circumscribed origin, who make it depend exclusively on the peculiar organization of the race of the steppes, have based their argument, peremptory and unanswerable as they imagine, on the prime fact, that it has always been possible to trace the diffusion of the typhus in a given country, to some sick animal of the steppes conveyed to that kingdom. In this manner it is, that they explain the generation of the epizootics which have so frequently wasted the continent of Europe. On whatever point of the globe they may appear, this, and only this, is the source of their existence. The isolated position of Great Britain is made to support their arguments. "Behold," they exclaim, "Great Britain, which, thanks to its surrounding seas, has escaped most of the epizootics which have desolated France and Germany during the early part of the nineteenth century." Nay, more, the present visitation of the distemper is also seized upon to sustain their theory, since certain oxen, natives of the steppes, appear to have imported it into London.

We must add, that nothing is wanting in order to prove this assertion; for they re-

late with perfect regularity, and step by step, the course taken by the contagion; they specify the time occupied on its passage, and even the names of the infected vessels which have thus imported the principle of the typhus.

It must be admitted that all the facts thus stated are indisputable; we acknowledge as true, that the bovine race of the steppes has conveyed into other countries the contagious germs of the disease; we admit that its dissemination may be thus accounted for.

But to admit this fact, and to draw from it the conclusion that the bovine race of the steppes alone is capable, by some particular and distinct organization, of developing the original typhus of the ox, and that this typhus has no other focus on the earth than the banks of the Dnieper and the Don, does not appear to us a sound logical deduction. And as, if this conclusion were positively recognised, we might see but one side of the evil, and deduce very serious consequences therefrom, it is necessary to receive these facts for what they are worth, and no more.

Let us first observe, that those writers who ascribe the contagious typhus to the race of

Southern Russia, do not take into consideration the epizootics of this typhus, the account of which has been handed down to us by the ancient authors of Greece and Rome; and that they refer just as little to those which are quite as frequent in the republics of South America as on the banks of the Dnieper. For even if we allow that once, and only once, one of these epizootics may be traced to the arrival of a ship containing oxen brought from the steppes, how, on the other hand, can we believe that all other epizootics have had such a fortuitous cause to generate it; consequently, the typhus, in these cases, must have been locally developed and diffused among American cattle?

Moreover, we seek in vain for the reasons which would authorize us to assign to the bovine race of the steppes a particular organization, rendering it alone fit to engender the typhus. But let us grant for a moment, that the Russian and Hungarian oxen constitute a peculiar race, as their framework and the length of their horns would seem to imply; this much being conceded, it still remains to be shown in what respect their anatomical and

physiological structure differs from that of other animals to such an extent as to render them alone liable to originate this fatal typhus.

Oh ! if it were true that the bovine race of the steppes alone could engender the typhus ! we would hail the fact with joy, and would show without much exertion of reasoning that, in that case, we possessed not only the means of preventing the disease by inoculating sound and healthy cattle, but the far more important means of sweeping it for ever from the earth, by at once exterminating that cursed race, smitten with the original predisposition of this plague ; and as, after all, the murderous scourge of the typhus of the steppes has already cost, and may perhaps continue to cost the various nations of the Old World millions upon millions, they would feel that their most urgent interest would be to come to an understanding (nor would the sacrifice be too much for their resources) so as to destroy and extirpate the evil at its original source. There would then be no difficulty in raising up a new breed of cattle in those countries, by transporting to it those of other nations free from the infection.

But who does not understand that this heroic sacrifice would be illusory, and that the foreign races, modified in time in this new medium, would regenerate the typhus ; so that the double sacrifice of extermination and indemnity would have been made to no purpose?

We wish we could adopt this hypothesis, so simple and so consolatory, of the circumscribed origin of the typhus, and its exclusive propagation through the race of the steppes ; but our mind is altogether opposed to that view, and for the following reasons, amongst others :—

If the bovine race of the steppes alone could produce the typhic virus, by reason of a particular organization which is the prime condition of its existence, *this race alone would of necessity be fit to receive its taint by the influence of contagion.* But if the other animals of the same species, as unfortunately too surely happens, can receive the principle of the disorder, develop the ailment, and die of its effects, then the reasoning of our opponents is faulty from its source ; and it must be admitted that all horned cattle are apt to generate the typhic virus in those countries

which afford the conditions of its production, and that this exclusive predisposition as it is called, attributed to the race inhabiting the steppes, is simply a chimera.

But arguments are seldom exhausted even to defend a bad cause, and it is objected that the fact that all oxen may contract the typhus transmitted by the contact of animals from one to another, does not prove that the original predisposition is the same in every race; and they persist in maintaining—1st, that the typhus of the steppes is alone able originally to beget the disease; 2nd, that having thus begotten and produced it, it becomes, after this organic conception, apt to be transmitted to every animal, and fit to be assimilated with them.

To these subtleties and argumentative refinements it would be as easy for me to oppose abstract reasonings equally strong, as it would have been for the Jansenists and Mollinists, had it so chanced that they had been drawn into a debate on the origin and nature of the virus of the plague which carried off Jansenius. But let us confine ourselves to serious facts and conclude—

1st. That we have no proof of any anatomical and physiological difference in the humours or in the blood—that is to say, in the organic, intimate, and biological elements of the individuals which collectively constitute the bovine species.

2nd. That we have a right to believe, that all horned cattle are apt to develop the typhic virus when they are placed within the conditions required for that effect—that is to say, when they are exposed to the special morbid causes which form its condition *sine quâ non*, and which are met with on the banks of those great rivers which water Southern Russia and Hungary, in Africa, on the banks of the Nile, in South America, on the margins of the lakes, and in what are called hot climates, &c.

II.

But if the origin of the typhus cannot exclusively depend on the peculiar organization of certain individuals of the bovine species, we must inquire after and search for the real causes which produce it.

We have explained already, in the First Part, what alterations organic matter undergoes in general, when accidental causes happen to modify its organic elements; and we have pointed out the fact, that of all living creatures herbivorous animals were those that offered the least vital resistance to the causes of disease and destruction.

This unquestionable fact being taken for granted, let us now consider under what conditions live the multitudinous herds of horned cattle which in Russia and in South America are reared and supported solely for the produce of their flesh, and sometimes, too, for that of their hides.

The great breeders and proprietors fix the number of their heads of cattle according and in proportion to the quantity of the pastures, but like other men, they mortgage the future for their benefit without making due allowance for accidents or extreme changes of weather, as when years of unusual drought succeed those of heavy rain; so that these herds, by the single fact of these extreme fluctuations in the degrees of temperature, are exposed to a multiplicity of causes productive of disease. The

same nature which generates life and health generates disease and dissolution, and when the former are neglected the latter will prevail.

In the prosperous and favoured countries of the temperate zone, such as England and France, these extreme variations in the seasons, which are always the cause of a deficiency or alteration in the production of fodder, are equally the cause of the numerous epizootics which attack all the herbivorous species, and particularly those to which oxen fall victims, such as the tumourous typhus (*le typhus charbonneux*), the so-called aphthous fever, the contagious peripneumonia (which is not liable to return and is prevented by inoculation), parasitical cutaneous disease.

But in less favoured countries, in those which are damp, argillaceous, swampy, inundated by the overflows of their lakes and rivers, or by the reflux of the sea, there is deposited a slimy or brackish water, which a temporary torrid heat afterwards causes to ferment; and then a superabundance of life, a teeming vegetation, springs up in all directions. In the midst of this swarming vitality live and

thrive an infinity of worms, maggots, animalculæ, insects, mollusca, fish, reptiles, birds, &c.; and here, too, all these creatures die and decay, when this slime, the prolific source of generations which we might look upon as spontaneous, begins to dry up and disintegrate. Then from these organic vegetable and animal matters, in a state of decomposition, escape those deleterious gases, such as hydrogen, carbonic oxide, nitrogen, carbonic acid, sulphuretted hydrogen, and even phosphoretted hydrogen.

Often to all these causes of infection are added myriads of grasshoppers, which cover the ground, where they die, aggravating the mass of pestiferous vapour which fills the atmosphere. Finally, the water which slakes the thirst of the herds of cattle is corrupted; the plants on which they feed distil poisons; the air, the water, and the plants, carry within them a principle of venom and death. After this, how can we be surprised if this flood of putrid emanations is transformed into a contagious typhic virus, whose subtle and pestilential effluvia are conveyed by the ox to considerable distances?

In fine, let us recapitulate in our minds all the causes of destruction to which these passive creatures are exposed, and we shall acknowledge that there is no necessity to attribute to them a peculiar organization in order to understand the development of the typhus, which, at a given moment, cuts them all off; and that in the deltas of the different countries, as well in Asia, Africa, and America, as in Europe, are to be found those conditions of infectious disease which we have described. In these causes, and only in these causes, or in those which resemble them, will rational men seek for the principle of the contagious typhus in the bovine race.

Moreover, who is there who does not understand that what is true with regard to cholera is likewise applicable to this contagious typhus? The cholera, for causes analogous to these, subject to the particular state of the soil, is generated, not exclusively, it is true, but most frequently, on the banks of the Ganges, in the same manner as the contagious typhus is developed in certain countries where its natural focus is found.

The race of animals which exists on this

deadly and destructive soil is an instrument of incubation for typhus, not in consequence of their peculiar structure, but because the conditions under which they live condemn them to this fate.

III.

Now the breeding of cattle, and the feeding and fattening of them for the market, constitute a branch of industry—a great interest. They all have to be removed, conveyed to various distances, and sold; so that this traffic becomes a new cause to be added to all those which foster, develop and propagate the distemper.

In prosperous times, when the seasons, conformably with our wishes, have pursued a course which we call regular (for we are fain to believe that the planets turn on their axes on our account), and when the cattle find the ground covered with rich pastures, and limpid streams—conditions which are eminently favourable in themselves, though in Hungary it is necessary to add gum, salt, mineral

water, and arsenic acid, before the health of these animals is satisfactory, — then the cattle breeders make their sordid calculations, and select the heads of cattle intended for sale.

With animals, as with man, health is but relative, not absolute; the healthiest in appearance often bearing within its frame the fatal principle of no distant death. Fatness not being by any means a sure sign of vital strength, many of these cumbersome beasts, though seemingly in good and sound condition, contain in their systems, in various stages of incubation, the tainted leaven of contagious affections, such as peripneumonia, or even the typhus itself.

But, regardless of this liability, their sale and migration are resolved upon at length. Hitherto these harmless creatures have lived in the most perfect stillness and retirement. Their calm, monotonous life has been as regular as the course of time; never by a single pulsation have their hearts exceeded the wonted number per minute; they are all gifted with a nervous sensibility of which the vulgar have no notion. Some favoured few have

felt the sympathy of friendship for the herdsman who tended them, and for the companions with which they fed. They have been leaders of their own herd; they have marched at their head; they have given the signal when to seek shelter beneath the trees, or when to repair to the brook. They have loved the fields amidst which they have grown and thriven. Some of them, reared and fed beneath the domestic thatch, were grateful for the care they had received; their master was endeared to them, they would run to meet his coming, answer to their name, and lick his hand with fondness.

And it is the course of this tranquil, this happy existence, that is about to be broken abruptly. It is this creature, the pattern of gentleness and goodness, that we are going to treat like a heap of insensible and inert matter—which we are going to subject to unutterable torture!

And now, indeed, these creatures are all at once handed over to the savage guidance, to the thongs and cudgels, of a hind, whose cruelty keeps pace with his stolid ignorance, and who abets his dogs to quicken their course to the

neighbouring market. From this moment, half-fed and athirst, these poor animals are forced to make long journeys afoot; or since the construction of railways, to be heaped together confusedly in a locomotive pen. There, the shaking, the sudden starts, the friction of five hundred wheels on the rails, the horrid snorting of the engines, alarm and terrify them to such a degree as to turn the whole mass of their blood.

In such a state of vital prostration or feverish excitement, entire herds are carried to the public markets or to annual fairs with other animals, and nearly all sent to the shambles. But some amongst them are reserved for another fate. The females, for instance, are set apart to serve as milch cows; and in this manner they carry with them into the cow-sheds, wherein they are received, the taint of those contagious distempers, the germs of which lay concealed in their frames, or which they have contracted from the companions of their journey.

Some of these heads of cattle, starting from the steppes of Russia, have to travel five hundred miles in an open cage, less cared for and

protected than bales of merchandise, exposed to the rain, to the heat of the sun, to sudden changes of temperature, to cold and cutting draughts, increased by the rapid motion of the train;—these animals, foundered, prostrate, panting with fever and torturing pains, still have to undergo new trials, if they cross the sea. In this case, the wretched victims are violently expelled from the locomotive, rocking sheds of the railway; a leathern strap hanging from a crane lifts them into the air, and lets them down into the mid-deck of a ship, where they are crowded as closely together as possible, for here, too, space is very costly. Finally, the vessel gets under way and ploughs the ocean; contrary winds beat it about in every direction, and these poor creatures have to endure a new kind of torture, accompanied by the intolerable pangs of seasickness; and in this state it is that they alight on the British soil, and are driven off to the different markets.

It is useless to expatiate at length on the state of general derangement and disease in which these oxen reach their final destination. Some amongst them have endured for eight or

nine days these unspeakable tortures, without being sustained by nourishment—for no animal, when his spirits forsake him, can assimilate his food amidst all this physical suffering and so great a shock to his nervous system.

Let us here declare that these animals, though removed from their meadows with all the signs and appearances of sound health, at a time when a fine season had been productive of abundance, and when no epizootia was raging in the country which they have left, may nevertheless bear within them the taint of contagious typhus; and let us ask ourselves what must come to pass in those disastrous years when this typhus prevails under the influence of those destructive causes which were passed in review just now, and when the Russian and Hungarian proprietors, eager to forestall an inevitable general calamity, hasten to send off to Italy, France, Holland, Finland, or to the ports of England, many animals already seized with typhus, and whose virus must have acquired infectious properties still more intense and deadly under the influence of the deep disquiet and commotion which the removal

and conveyance of these animals, under conditions so deplorable, must have produced in their frames.

Such are indeed the pernicious conditions in which oxen may be, and often are, dispatched to England; and such appears to be the real cause of the outbreak of the spreading epizootia which we witness at this moment, and which has created so much alarm in so many counties of England.*

IV.

Let us now consider this contagious typhus in its destructive extension over the British soil; let us study and examine the causes

* We are aware that the transport of cattle is conducted in a different manner during the prevalence of this epizootia. The account given by two German veterinary surgeons of the management of the vessels of the North German Lloyd's, and of the manner in which the animals are treated, is a proof of this; but before the appearance of the epizootia, the transport of animals by land and by sea left much to be desired. This account will be found at the end of this work (NOTE A); and all documents in support of the facts which have served as the basis of our dissertation, are also in the Appendix, arranged alphabetically in the form of notes.

of its diffusion as they pass under our notice.

The mooted question of determining whether the cattle typhus was originally imported from abroad, or whether it broke out spontaneously in England, has been, and still is, a subject of dubious debate amongst some professional men, amongst the leading writers of the public journals, and also amongst agriculturists and farmers.*

And, in truth, the propagation of the distemper is occasionally witnessed under conditions so singular and striking, that it seems to warrant and supply arguments for every conceivable opinion.

When the disease was recognised and identified for the first time on the 24th of June, 1865, public opinion ascribed its appearance to contagion arising from some diseased cows imported from Finland, and which, after being exposed in the Islington Market on the 19th, were sold and removed to the cowsheds of a breeder or dairy-man.

We may observe that, on hearing the intelligence of this sudden invasion, the public

* See Notes B, C, D, E.

mind, which is so excitable in England, did not disguise the indignation it felt against foreign countries which had been capable of contaminating an island so advantageously situated and so well protected, and infecting her magnificent herds, exuberant with health. But after a closer examination of the facts, and possibly alarmed, at the serious consequences of a Continental blockade which would deprive the United Kingdom, not of the entire twenty or thirty thousand live stock, such as oxen, sheep, pigs, &c., which they receive every week, but only of the eight or ten thousand head of cattle which are landed weekly on their coasts to supply their markets, public opinion was appeased. But, unfortunately, this national susceptibility now took the opposite extreme; and the only causes it now saw were the dirt and want of adequate ventilation in the metropolitan stables and sheds; and to these causes it attributed, first the generation, and then the propagation or diffusion of the malady; an opinion which appeared all the more natural and reasonable, in that the oxen and cows of the graziers were the first victims of the typhus.

We all know how liable, among all nations,

the public mind is to waver and fluctuate, and how susceptible and open it is to new impressions during fatal visitations and general calamities; nor can we feel the least surprise at the uncertainty which has so long prevailed, and still continues; as to the real causes of the introduction of the bovine typhus in England.

Let us therefore examine this question of etiology, and try to discover what opinion ought to prevail.

It is important to establish at once two material facts which seem to us indisputable :

1st. That the contagious typhus in cattle which is known to be permanent in the south-east of Europe, actually existed there during the month of June, 1865; 2nd, That some of the horned cattle, fed and reared in that part of Europe, were transported to England, after having crossed through Russia from south to north, in order to avoid passing through Germany.

As for the first of these facts, it is admitted and received, as might easily be proved by reproducing the speeches and addresses delivered by the veterinary doctors at the Congress now being held at Vienna, and at which were

present the men whose experience of this cattle distemper gives them the highest authority.—Hertwig, Jessen, Röhl, Siegmund, Gerlach, &c.

The contagious typhus of horned cattle is so fully in the epizootic state in those countries which are washed by the Black Sea, that it was enough for the veterinarians present at the Congress to manifest a desire to see cattle afflicted with this disease, for the opportunity so to do to be immediately afforded them.*

Thus, then, the fact is undeniable, the contagious typhus was raging, in June, 1865, in Hungary and Russia, as it rages there at all times.

As for the conveyance of cattle from those countries into England, the fact is no less certain and assured. It is well known that a convoy of 300 heads of cattle, proceeding from the pasture-grounds of Hungary and Austria, was transported into Finland by rail, and afterwards shipped at Revel for England. Thanks to the rapid locomotion by steam, the migration of these cattle had lasted but ten days—two days for the transport by land,

* See Note F.

and eight days for the passage by sea, through the tortuous line of the Baltic; but this was sufficient length of time for the incubation to be produced, even supposing the animals to have looked sound when their transit began.

Moreover, it is indubitable that the markets of this immeasurable London have for many years been supplied with horned cattle from every country: from France, Holland, Belgium, Podolia, Poland, Prussia, Austria, Hungary, and Russia.

Thus, the Islington Market (the fact is assured) had received horned cattle imported from the countries where typhus is known to be permanent. Were these cattle thus imported affected with the typhus? This fact likewise is as certain as the other, since two of the foreign cows thus imported, were the first to fall sick, and to die of this typhus.

But if the contagious typhus of horned cattle rages permanently on the banks of the streams which discharge themselves into the Black Sea, and if the beasts reared in those countries have long been transported to Eng-

land and other countries, how, it will be asked, is it that the disease has not broken out more frequently, for it has never been seen in Great Britain, at least, during the former part of the nineteenth century?

This question is not devoid of a certain degree of importance, and deserves to fix our attention for a moment.

Now the conditions in which the animals were exhibited in 1863 and 1864 were precisely the same as those of 1865, before the outbreak of the disease; and yet the contagion has been possible in 1865, whilst it was not so in 1863.

We do not presume to explain the mysterious phenomena which govern the development of epidemics and epizootics; but it seems to us not altogether impossible to give a rational and satisfactory elucidation of the facts.

In general, in *epizootics*, and I might even say in some particular epidemics—in that of the typhus, for instance—three connected and inseparable facts form the condition *sine quâ non*, of the generation of the disease. First, a focus for producing the virus; secondly, for

the most part a favourable soil, and a special predisposition amongst animals to receive and propagate it; thirdly, what is called an epidemic, or epizootic genius—that is to say, a particular state of the atmospheric elements, or the air, which hitherto has escaped our analyses, and whose morbid properties vary in their degrees of intensity. Thus the epizootic genius of 1711, the terrible one of 1750, and the one which now diffuses its contagious miasma, have differed in some of their virulent conditions.

However that may be, it will be sufficient to glance back at the past to assure ourselves that, in general, epizootics have been coincident with some violent change of season, such as extreme droughts, or superabundant rains; that is to say, when the cattle, disturbed in the physiological conditions of their health, have become favourable to the incubation of the miasmatic leaven scattered through the air, or else when these animals were living under irregular conditions, and had to endure unwonted fatigues and privations, as in the folds of campaigning armies, for instance.

These epizootics have appeared to depend

not only on the state of the soil and of the health of the cattle, but also (we repeat it designedly) on an element no less indispensable to the propagation of the disease—a special state of the air, which favours the development and preservation of typhic miasma: for sometimes a sudden change of temperature has proved sufficient to stop the rampant progress of the contagion, the other conditions remaining unaltered.

These relations of cause and effect between the contagious principle, the predisposition of the animals, and the state of the atmosphere, evidently are subject to some exceptions; but we must allow that in the present epizootia they are absolutely and completely applicable. For, in truth, the years 1864 and 1865 have been distinguished, if not by the persistency of a high rate of temperature not often witnessed, at least by an excessive drought during the months which are both hot and rainy; and this has happened in the various countries of Europe, thereby producing a falling off in the pasture and fodder both as respects their quantity and quality.

As to England, a country usually cold and

damp, but renowned for its spacious green fields and meadows, it has suffered more than any other country from these unfavourable conditions, and their destructive influence on the grass and corn ; the herds having found a great reduction of food where formerly they met with abundance. Everybody has seen, as we have ourselves, large herds of cattle, wandering in amazement from field to field, and seeking for something to browse on a parched and arid soil. A supplementary provision of corn, roots, malt, and the grounds of the beer vat or spirit barrel, no doubt served to mitigate the sad effects of these privations on the health of cattle ; but in spite of all that could be done, their blood became impoverished, their strength and vital resistance sank, and (like the animals which we transferred at will into a soil more favourable to the spread of parasitic diseases), they afforded last June, as they do now, an unusual predisposition to suffer and transform the morbid principles of typhus, which in all probability they would have been proof against at any other time. We may very fairly infer this much, for we must of necessity believe that the regular importation

of cattle from those countries which are considered as the permanent focus of typhus, has from time to time transported the miasmatic germs of this malady into England, although the virus did not take effect on British cattle at those periods, for want of one or other of the conditions necessary to its generation and development.

We may likewise infer, and a watchful appreciation of the facts contained in the veterinary medical journals would show that this opinion is not unfounded, that the special disease which constitutes this typhus (similar in that respect to epidemic diseases), may develop itself in one beast by accident, spontaneously, sporadically—that is to say, without immediate contagion; in a word, *apart from those epizootic conditions which alone render its propagation possible.* To be brief, we think that an isolated case of cattle typhus may by chance be detected, when there is no epizootia prevailing to account for it, just as we occasionally meet with cases of typhus or cholera among men during seasons absolutely free from these epidemics. It would not, therefore, appear to us altogether impossible, that under the in-

fluence of very special conditions, the contagious typhus of the ox might have its birth in England; and this would favour the theory of those reasoners who maintain that this typhus met with the first causes, and the origin of its development, in the stalls and cowsheds of London. But such has not been the cause of cattle typhus in the epizootia which we see at present.

No doubt some animals suffered great privations, but, whatever alteration their health may have sustained, all this is nothing to be compared to the sufferings endured by the cattle in the steppes under the influence of deleterious conditions of the most exceptional character, which do, indeed, give birth to this typhus, and which we have already described.

No, certainly not! *Nothing authorizes us to believe that the typhus now under our observation was bred and born, at first, within the stalls and cowsheds of London.* It was most assuredly imported. But it is true, nevertheless, that this cruel scourge found the horned cattle of England predisposed to receive it, and it likewise met with atmospheric conditions favour-

able to its subsequent diffusion ; in a word, it met with the epizootic genius proper for the generation and propagation of the typhus miasma.

It is thus that we may account for and reconcile the two contending theories, one of which refers the cause of this typhus to foreign importation, whilst the other insists that it originated in the filthy and half-ventilated cowsheds of the metropolis.

But if this typhus could not spring up spontaneously out of the bovine race of England, it must be confessed that, independently of the general predisposition due to a great and protracted drought, it found in the sickening sheds of the metropolitan and country cattle the most favourable conditions for its incubation and subsequent diffusion.

It would, indeed, be difficult to conceive of anything more directly adverse to the hygienic laws of health in cattle than the stalls and sheds dotted over the densely populated districts of London. Most of these pent-up cribs are situated in narrow lanes and yards, in filthy streets and blind alleys ; and within these close, hot, and steaming receptacles the

miserable cows, pressed against each other, without ever moving a limb, waste away and become phthisical in a very short space of time. We may readily imagine what a prey to the contagion must be afforded by these animals, already more or less ailing, some of which are fed in a great measure on malt, so sour and acrid that the very smell of it is intolerable. The milk from these cows is, moreover, of so wretched a quality, that in a cowhouse containing 48 of these poor creatures, at Kensington, I found only one, the milk of which exhibited the taste and quality fit for a sick child, for whom I ordered a milk diet.

It is not, therefore, to be wondered at that the present epizootia, during this late tropical season* especially, should have met with all the conditions most conducive to its development and propagation.

When the cattle distemper first broke out, the graziers, not suspecting its gravity, attempted to treat the animals themselves, but soon afterwards perceiving the fruitlessness of all their remedial measures, they felt that the

* On the 15th of September, the thermometer stood at 80° Fahrenheit.

best thing they could do was to turn their sick beasts to whatever account they could, by driving them to market or to the slaughter-houses, an expedient which they were the more disposed to adopt, inasmuch as the diseased cows had ceased to give milk. And then, the removal of these animals, in various stages of the disorder, became the most rapid means of disseminating the contagion, which, had it been concentrated and pent-up at first within its narrow focus, would otherwise have spread with less fearful havoc.*

In the meanwhile the sick cows being commingled with thousands of heads of cattle exposed for sale at the different markets, communicated far and wide the principle of the disease; and as a certain number of these animals remaining unsold were driven back to the farms, into stalls until then removed from every cause of contagion, they introduced among their sound companions the fatal germs of the distemper; and as, again, this effectual means of propagating the evil was repeated several times in the same week, the consequence was that, by the end of July—a little

* See Notes G, J.

more than a month after the outbreak—the whole of the south of England was in some sort contaminated. Thence the contagion extended to the north of the kingdom, and passed into Scotland; so that, at present, the cattle-typhus has spread its ramifications over a great number of the counties of Great Britain.*

In the first instance, the contagion spread from animal to animal by means of an infecting influence in some degree direct, among cattle sheltered beneath the same roof, or collected in swarms within the same markets. But very soon the air itself was impregnated and polluted by the vaporization and diffusion of the typhic miasma; and herds of cattle which had no contact, either direct or indirect, with infected animals, were seen to be tainted with the distemper. Whether this contamination was produced by the passage of attainted cattle along the public roads (having fields on the right and left), or otherwise, nothing but an absolute isolation, an utter impossibility of contact, appeared to offer a perfect immunity against the spread of the evil.

* See Notes K, L.

The miasma, condensed by the fogs and transported in all directions by the winds, now began to overleap every natural or artificial barrier, and the favoured herds, ruminating at their ease in the manorial farms of the wealthy patricians, in their well-kept parks and amid every luxury, were suddenly smitten with an evil which in their case seemed an anomaly. In such peaceful homes these innocent creatures were tended by intelligent and benevolent hands, which understood and felt for their frail constitutions; food of the best quality was lavishly supplied to them, and whatever they could wish for lay around them in abundance; richly reared, they had themselves become so many ornaments within these scenes of beauty, and all men thought that here, at least, were plots of rural ground which the genius of epizootia would not invade, and in which the healthy herds were invulnerable to contagion.

It was under these circumstances that the fine farms of Earl Granville, at Golder's Green, skirting the Finchley Road,* containing as many as 130 milch cows, were suddenly and

* See Note M.

fiercely attacked amidst their seeming immunity, and struck down in great numbers.

“When I left England a month ago,” said the noble lord, “there were about 130 milch cows in four sheds; in the two largest and best managed I found only one cow yesterday, September 4th.”

The park of Holly Lodge,* which is partly bounded by the main road along which pass and repass files of cattle going to and coming from the markets, was visited by the same unsparing scourge. Now certainly, the noble and beneficent lady of the manor, who secured to her cattle every attention, and who, confiding in the resources of medical science, attempted every means to save these stricken creatures doomed to an inevitable death; she whose enlightened mind, equally open to the claims of science as to those of misfortune, desired that experiments should be made which might tend to throw any light on this devastating malady; she, at any rate, one would think, might have escaped the common lot without exciting wonder or envy at the privilege which she enjoyed. But this fell

* See Note N.

and sweeping epizootia, inexorable in its latitudinarian march, entered those shady bounds, and decimated those orderly sheds with the same impartiality as it did that of the poor man, Cutting, whose whole fortune was stored up in the two milch cows whose death he had to deplore.

This epizootia threatens to invade, one by one, all the European States, like the awful scourge of 1750, to which we have already drawn attention. For even now Holland and Belgium* have been smitten; and the alarm it has excited has for a time superseded the panic which the stealthy advance of the cholera to the west had kindled. Some imagine that it might have been kept out of Great Britain, or have been checked in its outbreak. But, in spite of all the safest precautions and the soundest measures of preparation, it would most likely have baffled human skill, and neither been held aloof nor stifled in its focus. But how painful it is, to have to write and to think that ignorance, carelessness, revolting cupidity, and the most wanton violation of the laws, have all contributed to

* See Notes O, P.

extend the evil, with the foulest premeditation and the blindest disregard!

To feel one's self a stranger in a country, and to be able to rejoice at one's connexions with it, and at the same time to be obliged to give publicity to certain truths distasteful to those to whom they are told, is a most painful task. But, as it would be to swerve from that duty and loyalty which the national interests as well as those of science impose upon a writer, not to speak out with impartial justice in a matter of so vital an importance, we beg permission to consider, without reserve, this delicate question:—the causes which have contributed to propagate the complaint.

V.

England, so long spared by that wasting scourge, which had so often extended its ravages over France and other kingdoms during the last sixty years, was taken by surprise; and the regulations and laws necessary to stifle without delay the distemper in its focus—that is to say, in the metropolis—not being

in readiness, the outbreak of the disease found her helpless and unarmed.

On the other hand, the organic forms of the English Government and municipal bodies, the reserve of the Cabinet during the vacation, the limited power of the Lord Mayor and his civic counsellors, the subdivision of London into parishes and vestries, as in the good times of the middle ages, the loose scattering of the shambles and meat markets through the many streets of the huge town, the right asserted by each man to be absolutely independent and free, the sanctity of the Englishman's home, &c., &c., all concurred to let loose and propagate the contagion, instead of keeping it within bounds.

Indeed, whilst the competent authorities, with all the energy which could be expected of them on so grave a matter, were meeting and discussing the best measures to be taken, and the interesting debates at the Mansion-house were throwing the first light upon the question, the insidious malady pursued its destructive progress, diffusing new terror and alarm. When at length the Privy

Council issued their orders, prescribing the public declaration of sick cattle, and that no affected beast was to be conveyed either by rail or by ship, whilst all the necessary means of purification and disinfection were to be employed, &c., it was unfortunately too late, the dreadful calamity having taken root and multiplied its stem like the upas-tree.

What a field for reflection there is in these cases, which originating with the imperfect state of the laws and institutions, have fostered and encouraged the disease! But this is a subject which it would not behove us to discuss, and we prefer to show by the notes which will be found appended to the end of this work, and which are produced as attesting documents, that cattle proprietors, by their own confession, too often sacrifice the interests of the public to their own private advantage.*

Nor have we been able to participate in the thoughts and reflections of so many sensible and judicious persons, on the impotence and dilatoriness of the public authorities, and also, let us say, on the inadequate pecuniary means

* See Notes R, S, T.

proposed by a people so lavish of its wealth when useful and great undertakings are designed, without paying a natural tribute of regret, to the memory of a Prince who took so deep an interest in the progress of agriculture, and who, had he still been living, would have known how to direct with a firm and steady hand, the right measures to be taken amidst so many intricacies and embarrassments.

Sometimes allusion has been made to France in the speeches delivered at these meetings, presided over by that active magistrate, the Lord Mayor. In the course of these remarks the speakers have praised and held up to admiration the advantages of her system of centralization, the decrees of her sanitary police, and the promptness with which she executes the measures which the public interests require. That is true. France is certainly in a state to resist the scourge with very effectual means to arrest its progress; but if in this matter, as in some others, she have acquired a superiority, it has only been by an experience dearly purchased, these epizootics having returned more than once to destroy her flocks and herds. Politically, the same might be

said of her révolutions, those great moral epidemics.

An orator, a writer, went so far as to say, in one of his numerous letters, the one dated the 24th of August: "I regret to say some of our neighbours laugh at our expense."*

No, your neighbours will not laugh at your misfortunes. They sympathize at present both in your joys and sorrows, and if I have taken up my pen on this occasion, it has only been because I could not look with indifference on your too just anxieties, when I flattered myself that I might write some useful pages to mitigate and relieve them.

As most newspaper readers are aware,† and as everybody may easily ascertain, the diseased cattle, in spite of reiterated orders to destroy them immediately, were, nevertheless, driven to the markets to be sold for what could be got for them; or when their tainted condition was too glaring they were at once sent off to the private shambles, the owners of which, in order to disguise the accusatory proof of the misdemeanor, hastened to sell the body of the animal. It would be quite impossible to men-

* See Note V.

† See Note Y.

tion all the violations of the law, which every day continue to fill the columns of the public journals. One graceless wretch, who deserved to be hanged for it, if his ignorance do not excuse him, was so infamous as to introduce a sick cow into a shed not yet attained, in his criminal desire of propagating the disease there.*

Thus, then, independently of the causes inherent to the typhus itself, which served of necessity to diffuse it, other causes proceeding from the defective state of the law, and the perfidy of individuals, have contributed to its dissemination. And yet the Government circulars, the newspapers, and the reports of veterinary doctors have made known that the slightest omissions and inattentions were serious—that the want of ventilation and cleanliness in the stables, the overcrowding of the cattle, and their abiding near their own droppings, or dung-heaps—that the keeping of dead bodies close to farms, cow-sheds, enclosed grounds, and fields—that the hasty and imperfect burial of cattle—that the collection and transit of their fragments, bones, horns, and skins—that the driving on the public roads of

* See Note Z.

any animal either tainted itself, or having lived among those that were sick—that the clothes of persons and stable utensils, soiled with putrid liquids—that all these, and similar causes, were capable of propagating or aggravating the disease.

But whilst we must loudly condemn the voluntary misdeeds of those who drove their sick cattle to market, it must likewise be allowed that, to conform one's self rigidly to the given injunctions, was sometimes attended with serious embarrassments. How great, indeed, must have been the perplexity of any grazier who, being the owner, for instance, of forty head of cattle, and having seen ten of them perish under his eyes, without knowing where to dispose of them, was threatened with the loss of the remaining thirty within a few days! How could he calmly and patiently resign himself to suffer so large a quantity of animal matter to accumulate and putrefy around him, when, suddenly ruined, and destitute of every resource, the authorities held back instead of coming to his assistance.

The prime cause of all the transgressions committed in despite of the Privy Council's

orders, may therefore be referred in part to the want of compensation to be granted to the owners of infected cattle. It all might be almost reduced to a question of money. For let us suppose for a moment, that inspectors entrusted with adequate powers, had been authorized, after a close examination, to point out the tainted cattle; to fix a moderate price on them by way of compensation; to have them slaughtered, carried away, and immediately buried, would not such a course have diminished the generation of contagious miasma in a considerable proportion?

Moreover, some cattle-breeders and farmers exposed themselves to the imposition of fines and penalties without any evil designs; for when they drove their beasts to market they were only in the stage of incubation, at the preliminary period, when it is really no easy task to distinguish the distemper. The following fact will exemplify this.

At each market, in spite of continual warnings, the inspectors pick out and despatch to the slaughter-houses a certain number of sick cattle, not only those affected with typhus, but with other disorders. One cannot help won-

dering, on seeing the poor, lean, sickly condition of some of these creatures, how their owners could have been so mad as to expose them for sale; but in their number there are a few which, although sick, appear in good health to the common observer.

About a fortnight ago, during one of our visits to the great Metropolitan Market, Mr. Tegg, the veterinary inspector, whose intelligence and earnestness are quite equal to the very difficult charge with which he is entrusted, ordered to be seized and removed to a secluded fold near the slaughter-houses, a dozen diseased animals. When once these cattle had been thus collected in a body, it was easy to submit them to a still closer examination. Most of these beasts, adult cows and oxen, were lean, panting, feverish, dispirited, and remained motionless where they stood. But among them was a cow, with a brisk and lively look, a quick open eye, which watched us with anxiety, and fled at our approach every time we passed by her. The turn came for this cow to be examined. Mr. Tegg, strong and handy—as every good veterinary doctor should be—seized hold of one of her horns, but he

was quickly shaken off; other persons came up to assist him; the fiery animal was suddenly seized by both horns, by the nostrils, and the tail; but so strong and spirited was the animal, that she defended herself with advantage against all her adversaries, and once more shook herself free.

It was necessary, however, to master the creature, so they surrounded her again, pressing her back this time into a corner of the pen, to overpower her. But lo! the animal takes a sudden spring, and leaps over the bars. Assuredly this cow, for a beast suspected of the typhus taint, had given a proof, if not of health, at least of extraordinary vigour; and her owner, who had seen her condemned with much vexation, now thought he saw ample reason to reclaim her, and drive her back to the market for sale. However the cow, on taking such a leap, and under conditions so unfavourable, came down with all her weight upon her limbs, fracturing one of her fore-legs.

After this accident, we were able to prosecute the examination we desired, and Mr. Tegg showed us a row of little glandular swellings on the ridge of the gums, and livid spots on

†

the vaginal mucous membrane, which confirmed his diagnosis. The owner of this cow, nevertheless, still discredited the diseased state of the beast ; so to convince him, she was driven off at once to the slaughter-house to be struck down ; but, unfortunately, three or four others filled the required area, so that the poor cow was forced to witness the execution of her fellow-creatures before being killed herself. The look and posture of this cow, her excited yet terrified glance as she surveyed this scene of carnage, was one of those pictures which no pencil could draw ; and although we acknowledge that man possesses an incontestable right to apply to his own use the dead or live matter of animals for his food and sustenance, we could not help feeling for the poor victim, slipping over the blood, and thus scenting death before receiving the stroke.

We are not excessively sensitive ; we have seen a hundred horses bleeding from the incisions made by veterinary pupils, and scores of oxen slaughtered ; we ourselves have practised numerous experiments on animals ; but the affecting sight of that animal witnessing the slaughter of others, and waiting her turn to

die, touched us deeply. We could not help asking ourselves, how it was that man could dispense with compassion and good feeling even in that bloody toil, and why he did not bandage the eyes of the doomed creatures he was going to sacrifice? These dumb animals that we treat like inert matter are sensitive like ourselves; they are very conscious of pain; and if it be our privilege to compute the number of our days, we ought not to forget that they are, like us, endowed with intelligence, so that when they are thus detained at the place of execution, all their senses and faculties being concentrated on their destroyer, they are fully conscious of the cruel fate which awaits them.

At last it was the poor beast's turn to be slaughtered, and ten minutes afterwards we opened her entrails, and had proof that Mr. Tegg's judgment was exact, for already the stomach and intestines offered to view indubitable signs of the typhus at its first period.

The owner of the cow was then convinced and brought to reason, but he still very fairly asserted the goodness of his motives, about which none present doubted at all, and applied

for compensation to the full value of the beast, both as butcher's meat and offal, which application was granted.

Judge, therefore, by this particular example, how many tainted cattle there must have been which have propagated this distemper, some with and some without the knowledge of their owners; and, "*horresco referens!*" how much of this tainted meat must have been purchased and eaten by the public, since this cow had all the appearance of health and vigour, and the real diseased condition might not have been detected at all, but for the experience and sagacity of Mr. Tegg, the inspector.

VI.

In this consideration of the causes of the contagious typhus in bovine cattle, we have deemed it essential to invite attention both to those which are generally recognised and admitted, and to those which, though they may have been settled in the minds of observant and experienced men, may yet appear hypothetical to certain readers.

Besides which, in every scientific work, allowance must be made for the past and

future; and here we have two vital distinctions. If the man who undertakes this task does not go on, he falls back; and it was to avoid incurring this reproach that we have passed our old boundaries and visited new avenues. We are aware that more than one objection might be urged against the opinions and theories which we have exposed, in order to account for the outbreak of typhus in England; we might anticipate, we might reply to these objections; but we would rather recapitulate our inquiry into the causes, in the tangible form of practical propositions.

From the general considerations above given, we think we may conclude,

1st. That the causes which generate the cattle typhus on our globe are permanent and unceasing, not only on the banks of the great rivers which empty themselves into the Black Sea, but also in other countries—in America, in Africa, &c.; wherever, in a word, exist the conditions, not of race (the race of the animal in this case being but secondary), but of climate and of the organic elements which are indispensable to the formation and development of typhic miasma.

2nd. That the cattle typhus, although it exists not necessarily, but through the improvidence or want of caution in man, on different parts of the earth, never appears at all in the temperate and more genial zones, save under particular and special circumstances, analogous in some degree with those which generate the human typhus—inclemency of the seasons, overcrowded dwellings, bad or insufficient food, and want of cleanliness; and that these particular and special circumstances give birth to the epizootic genus, rendering the cattle fit and apt to receive the germs of the contagious virus, and to foster its incubation.

3rd. That the cattle typhus, thus accidentally developed in the temperate and genial zones, by means of the vicious hygienic conditions amidst which horned cattle are accustomed to live, and which serve as the causes of its propagation, is afterwards transmitted by the contact of animals living in the same stall or shed, or collected in herds on the same ground, or transported in the same vehicles, by land or sea.

4th. That the droppings of animals, their litter, their dead bodies, and their detritus, or

broken-up remains—also the stables, vehicles, and implements which have served for their use, and all matters or substances which have touched them or approached them—are generative elements of the distemper.

5th. That the typhic miasma, thus reproduced and multiplied in one place under the influence of all these producing causes, is conveyed by the winds to great distances, smiting those well guarded cattle which appeared to be fully protected from the possibility of infection by their isolation.

6th. That the want of prompt and stringent measures first to concentrate, and then to stifle this typhus in its focus; the love of lucre, the perfidy of some, and the absence of foresight and caution in others, may be, and have been in the particular cases which we are dealing with, material causes and agencies of its diffusion.

Such we consider to be the causes which engender and propagate cattle typhus, and which will serve as a basis for the preventive measures to be employed in order to withstand and check its propagation.

CHAPTER III.

Description of the Contagious Typhus of the Ox ; its Symptoms, Course, Progress, &c.

I have already written the history of the typhus which affects the ox ; I have shown and dwelt upon the signs and characters of typhus diseases generally, deducing therefrom the denomination and definition of that of the ox in particular ; finally, I have described the causes which generate and diffuse it abroad.

Now, I must make known the various phases and alterations to which the disease is liable, and which, in the language of the medical schools, are called its symptoms and characteristics ; its progress or course ; its prognosis ; its *post-mortem* appearances, &c. &c.

This examination, like those which have preceded it, will afford new foundations for medical practice.

I.

Symptomatic Characteristics.—The typhus of the ox, like all infectious and contagious diseases, offers to observation four successive changes: 1st, a *period of Incubation*, during which the original structure is subject to internal and latent derangements; 2nd, a *period of Initiation*, during which the first evident signs of the disease are manifested; 3rd, a *period of Endurance*, during which the phenomena are fully developed; 4th, a *period of Decline*, or wasting atony.

These divisions and classifications, it will readily be conceived, are rather fanciful, for nature does not adapt herself to our methodical forms. Still we shall abide by them, because they have their relative and practical utility, and because they will afford to the practitioner suggestions more easily understood; and finally, because the organic changes are different at these various periods, which in their entirety constitute the typhus of the bovine species.

The description of those different phases through which the organism of cattle smitten with the contagion has to pass, has moreover

been given in a masterly manner by the veterinary physicians of the different European countries, especially by those in which opportunities to observe it have been most frequent—that is to say, by the Russian, German, and French veterinary doctors, Jessen, Rööl, D'Arboval, Gellé.

The English physicians of the 18th century, as we have already seen, were also in no respect inferior to those of our own time. Finally, Mr. Simonds, who published a very able Report on his return from his scientific exploration in Galicia, in 1857, and the skilful Professor Bouley, in his recent communications to the Académie de Médecine, in Paris, respecting his examination of the present cattle typhus in England, have described the disease with minute exactness, as we ourselves have verified on the various sick beasts which we have seen during the last two months.

1. *Period of Incubation.*—Several careful experiments, which have been cited in the historical division of this work, and numerous fortuitous occasions, have authorized us to assign a duration of nine or twelve days to the period of incubation, according to the

general conditions of the epizootia, the manner in which the contagion is transmitted, and the former state of health of the affected cattle.

Thus an epizootia at the outset, either when it has become general, or when it is at its decline, does not always transmit typhic miasma of the same virulent intensity, nor does it always provoke in the frame a labour of incubation which is invariable. The contagion transmitted from animal to animal living continually in the same stalls or sheds is followed by an incubation more quick and active than that which results from a chance contact in the markets, or from a contagion produced at a distance, by the transmission of the miasmatic effluvium along the public highways.

Let us add to these considerations the relative state of each animal's health, and we shall then perfectly understand that the incubation must vary both in its continuance and in the characteristics of its manifestation. In some animals it scarcely betrays the derangements produced by its morbid operation: they preserve their appetite and their usual looks. A close and attentive observation would alone be

able to distinguish some slight alterations in their way of living, in the regularity of their rumination and sleep. But in others, there is no mistaking a something irregular and unusual in their appearance and living; the vital state is no longer the same. Thus an animal which used to be cheerful and familiar becomes silent and solitary; it browses the grass with less eagerness and avidity; it lies down more frequently and longer; it lingers by the side of the hedge along the field, or it wanders about, here and there, with a listless look, and without any object. Others moan and complain, bellowing at intervals in an unusual manner, very expressive of languor and pain.

But apart from seasons of epizootia, the beasts too often exhibit these imperceptible shades of variety in their looks and actions for the attention to be struck by them; these changes, therefore, are almost always unnoticed.

However, the typhic miasma absorbed at the same time by the respiratory and digestive mucous membranes serves to modify the qualities of the blood, and secretly reacts on the

nervous system ; soon after, the animal exhibits more decidedly those changes which previously were hardly to be detected ; his want of appetite is more marked, his sadness more obvious, and his attention fixes itself more slowly and carelessly on the objects which surround him. When he is in the shed, his usual food is found in excess of his wants, his thirst is much keener and more frequent, and a continual dejection and lowness of spirits or a transitory agitation disturb all his functions. When the farmers or graziers notice these premonitory signs for the first time they pay but little attention thereto ; but if the contagion has found its way into their stalls and sheds they are no longer deceived by them, but begin to apprehend that in a day or two fresh victims will be added to the number.

2. *Period of Initiation.*—Soon the elaboration of the virulent miasma in the organic structure changes the quality of the blood and humours, the functions of assimilation and secretion are modified, the nervous centres receive vitiated organic elements and are disturbed in their physiological conditions, and the smitten animal displays that state of latent uneasiness

which he is imperfectly conscious of by a general look of heaviness and stupor (*Τυφος*), which has suggested for this disease its name of typhus.

Indeed, the poor animal's eyes are fixed, the hearing becomes obtuse or indifferent, as may be seen in the sinking of the ears, those organs which are so sensitive, so contractile, and so vigilant in herbivorous animals. With the head hanging down and motionless, the neck stretched out, their forelegs open and spread, their buttocks drawn together and one of them completely lax, they seem to succumb beneath the weight of their bodies. In a word, the animal exhibits through its whole bearing a heavy sadness, a general dejection, which bespeak a great derangement in the whole structure. From this time, in the animals which are most seriously affected, the appetite ceases, the rumination becomes irregular and partial, whilst in some others the appetite and rumination are maintained in different degrees.

But the incubation of the morbid elements pursues its course, the alteration of the blood becomes general, and the circulation is increased and quickened. After this the fever inter-

poses and stops the secretions, that of the udders is dried up, the mucous channels cease to flow, the mucous membrane of the mouth becomes whitish, the little glands situated on it are more permanent, especially in the circumference of the gums; the floor of the tongue and the larynx are inflamed, the mucous membrane of the cow's sexual organs is red and furrowed with livid streaks, the white of the eye is parched, and the skin feels alternately hot and cold, as well as the horns and hoofs.

Some of the sufferers have an external horripilation, transient shiverings are felt in the front and hind quarters and at the junction of the limbs with the trunk. Some pregnant cows near their delivery miscarry. In a word, at this period of irritation, the whole frame is at war with the typhic elements which besiege it, and which overcome the preservative power of the vital forces, and from this general disturbance arises an incandescent fever, which drains and stops all the secretions at their source.

These general symptoms are the first signs and warnings of functional derangements more significant, which may, however, vary according to the predispositions of each animal,

and transfer their evolutions either to the nervous centres or to the respiratory mucous membrane, or to that of the digestive channels, in the inflammatory and febrile form of the contagious typhus. Such at least is what we observe in the typhus of 1865 in England.

The functional derangements, in truth, subordinate to and depending on the predispositions exhibited by the cattle, are far from being the same in all. In some, the nervous derangements predominate; in others, it is those of the respiratory, and in others, it is those of the digestive channels.

As in this period of irritation the nervous centres are more particularly affected, the animal suffers cerebral and rickety pains, a constant cephalalgia, which provokes vague anxiety; he is sometimes cheerful, sometimes wild and furious; he clenches his teeth and yawns, the muscles of his face spasmodically contract, the spine feels very sensitive when pressed, a burning and insatiable thirst comes on, the breathing is hurried, and the intestinal evacuations are suspended.

In this form the toxæmia appears to con-

centrate about the nervous centres—as is observed elsewhere at the outset of certain violent fevers, in the typhus and typhoid fever of man, for instance—and some of their number may perish the victims of these nervous disorders, and even fall as if struck with electricity. They die apparently from the result of the typhic poison; for at this second period, we do not trace in the nervous centres those injuries which might account for so sudden a death.

When the respiratory apparatus concentrates upon it the febrile congestion, the breathing becomes painful, accelerated, embarrassed, sometimes convulsive, and a deep, oppressive cough is heard from time to time. The animal, under the yoke of this oppressive uneasiness, turns his head from right to left, scents, and seems to question his flanks, where the seat of the disorder is; and then, whether the pulmonary affection is congestive or inflammatory or emphysematous, he may die of the consequences of obstruction to the pulmonary circulation and from the alteration of the blood, under the influence of a

slow asphyxia, but only at the third or fourth period.

Finally, when the typhus localizes more particularly its morbid phenomena on the digestive channels, we discern local alterations on the floor of the tongue and the buccal mucous membrane, spots of livid red, leaving behind them ulcerations of greater or less extent and depth on different parts of the intestinal canal. In this form, which follows more regularly all the periods, constipation is obstinate at the outset, evacuation of the bowels takes place with difficulty, the fæces are hard and the urine scanty, the belly is inflated and sensitive.

Sometimes at this period of initiation, one of these three symptomatic forms—the nervous, the pulmonary, and the digestive—may predominate exclusively, so far as to mask the disease as a whole, and to constitute it a special malady. But in that case, it is only the exaggeration of the functional derangements which in their total constitute the typhus: for when the distemper pursues its course, these three principal centres of life

are always affected in different degrees. Thus, not one of the cattle smitten with the typhus goes through all the phases of the disease, without suffering at a given moment in its nervous, respiratory, and digestive functions.

In this respect, the typhus of the ox presents an apparent analogy with the typhoid fever in man, although it is different. Consequently, the name of *typhus fever* given by some veterinary surgeons, is not altogether inapplicable to it.

3. *Period of Duration.*—At this stage of the disease, which may be said to extend from the fourth to the seventh day, the nervous derangements are confined to symptoms of uneasiness and sensibility along the dorsal spine; for those cases which exhibited more violent derangement in the nervous functions have proved fatal. In this period of the disease the breathing is more embarrassed, particularly when the pulmonary form of the disease prevails. The pulse, which is hard and frequent, indicates from forty to sixty pulsations; the beatings of the heart are more violent and audible; the mucous membranes, dry at the

outbreak, recover their secretions, but these latter are endowed with irritating properties. Thus the eyelids, swollen and tumefied at the edges beneath the lashes, drip with a corrosive liquid, which soon marks its furrow along the chanfrin; the bronchiæ, the trachea, the nostrils, the salivary glands, exude a serosity which runs out of the nasal and buccal orifices. The exanthematic eruption having discharged itself through the digestive channels, constipation is followed by diarrhœa, rumination is completely stopped, the beast declines all solid nutriment, and pants for drinks,—for those especially which have a slight taste of acidity in them.

The derangements at this period pursue a rapid course—the breathing becomes more and more difficult, the skin is hot and dry, the hairs stiffen more and more, gases are developed in the cellular tissues beneath the skin, along the dorsal vertebræ, at the abdominal folds of the posterior limbs and under the abdomen, in the form of flat, uneven, crepitant tumours, which crackle when pressed with the hand; the diarrhœa becomes more liquefied

and irritant, for then it is no longer a flow of droppings covered with mucus which is expelled, but secretions already putrid, sometimes reddish in colour, and attended with foetid gases, which induce tenesmus in the rectum, and force up the tail. The animal grows perceptibly lean, his dejection is extreme, and cows which are with calf miscarry.

At night, the animal seems to have an increase of fever, sometimes of a remittent type, after which he becomes drowsy and lies down to rest himself or to sleep, if he can; but the difficulty of breathing, the abdominal pains, soon force him to rise again, which he cannot do without an effort.

4. *Period of Decline and Sinking.*—This stage is observed to extend from the eighth day to the twelfth or the fourteenth. The morbid functions pursue their course, for the disease has its regular phases and a successive variation of phenomena. The secretions, which a few days before were fluid and irritating, have undergone a change; they have become thick and purulent, they flow more slowly

from the ocular mucous membranes, and also from the nasal and buccal, which are red and inflamed, and they already emit a foetid smell. The dull tarnished eyes become hollowed, purulent mucus lodges within their orbits, the bronchiæ are stopped up, the breathing grows louder and more panting, the animal instinctively stretches his neck to ease it; the wasting of the flesh exposes the bones of the sacrum and coccyx, laying bare the vertebræ and the ribs; the emphysematous tumours are more extensive and crackling; the skin, less heated, wrinkles up and splits about the bony protuberances; the udders are crusty and excoriated; detached boils, hard and rounded at first, then soft and purulent, begin to show themselves on the trunk and the upper parts of the limbs. The diarrhoea, still frequent, becomes bloody and intolerably offensive.

At this final period the organic structure yields to the effects of a general alteration of the liquids and solids. The vital force has lost the power of reaction; a mass of blood, decomposed by the double influence of a viru-

lent toxæmia and the obstructions of respiration, conveys to all the organs a principle of dissolution ; the nervous system is in a manner paralysed, as is shown in the animal's insensibility.

The secretions stop up the various channels and cavities ; they lodge within them ; they undergo a putrid decomposition, and pass out with difficulty in the form of a purulent and bloody flux, in the highest degree infectious. Very soon the sick animal has ceased really to live ; it struggles and labours with its agony ; if the lungs are clogged with gas or fluid they rattle hurriedly and often ; the animal cannot hold its head up even when lying down, and when standing moves it to and fro as if affected with the natural shaking of old age, and as if seeking to ward off some indescribable evil, the occurrence of which it was awaiting.

The animal's body is a prey given up beforehand to the laws of organic decomposition : the internal mucous membrane of the cheeks and lips peels off in strips when rubbed ; the sores on the skin have a livid and gangrenous look ; the eggs which the flies deposit on the

edge of the eyelids and at the nasal orifices, or on the excoriations of the skin, quickly pass into the state of larvæ. The air they expire is cold and infectious; the native caloric, extinguished in every focus successively, disappears; the vaginal mucous membrane is tumefied, the anal opening gapes, and from it flows a bloody and decomposed liquid which the rectum can no longer expel. The mouth, half open and coated with a thick glutinous foam, vainly tries to inhale long draughts of air which can no longer reach the lungs. Finally, if the animal is lying down, he expires in slow agony, his head borne down by its own weight; or, if standing, he sinks and falls down, his death having anticipated the fall.

Such are the symptoms—the subjective signs which enable us to detect the contagious typhus of the ox. But all animals do not exhibit these disorders of the vital functions with the same regularity and excess. Some of these we have seen, from first to last, sustain the internal effects of the morbid process—in some sort passively—without revealing any deep derangements in the nervous, respiratory, and digestive functions. The

poisonous virus had smitten them; they suffered in their general structure; they looked stupefied; they lost, at a given moment, their appetite and rumination; they had fever; their breathing had become short and frequent; they had diarrhœa; they gradually lost flesh, and the excreta passed through certain changes and transformations. In a word, the animal had manifestly the bovine typhus; but, thanks to a relative immunity, to a special organization, which renders some of these beasts capable of resisting the contagion for a long period, and sometimes altogether*—thanks to that variety which we observe in different constitutions (for small-pox and typhus in man, and the true typhoid fever in animals, do not operate with the same violence on all alike)—thanks to this privileged organization,—we have seen some oxen pass through every stage of the disease without exhibiting this terrible train of morbid phenomena.

In these cases—for even this mild form of

* Mr. Simonds has for three months had under his observation a cow which has lived with impunity among animals sick and dying of the typhus. And a young calf did not contract the disease for more than three weeks.

the distemper at last produces death—the injuries fix themselves more exclusively on the digestive channels, and we witness, in dissection, ulcerations in some, in others mere spots of a livid red, more or less extensive.

Finally, although the typhus be one of the gravest maladies which destroy and decimate cattle, all sick animals are not mortally affected thereby. In the present epizootia, five per cent., as nearly as can be ascertained, recover; and when that happens, signs of a favourable omen are observable during the course of the attack. In these favourable instances, indeed, the symptoms, even though they exhibit a certain gravity, pursue a regular course; fever does not become remittent; the fæcal discharge is copious and easy, with less fœtor; the animal loses flesh slowly and progressively; the tumours are cutaneous, inflammatory; their character is good, depurative, and rather purulent than gaseous and crackling. The droppings do not show that high degree of pestilential decomposition described above; the animal in his drink welcomes and digests a mixture of bran and flour; the secretions of purulent mucus and the fæcal discharges dry

up and stop in the early part of the period of decline; the epidermis of the openings through which they passed out peels off in thin scales, and afterwards in scurfs or husks—in a word, the economy does not experience those acute disturbances which strike one of the tripods of life—that is to say, either the nervous centres, the lungs, or the digestive organs.

Now, in these curable cases, in which the cure is most generally due to nature's own efforts, but which a systematic treatment might render far more frequent, the convalescence is long, and requires great attention and a well-regulated diet, in which the food is carefully measured and divided. Here there must be a rigid superintendence. A laxity in the watchfulness, or too much reliance on the reviving health, have produced sudden relapses, and been fatal to many sick cattle, which had been looked upon as thoroughly cured. For it may well be conceived that convalescent animals, after sustaining such violent derangements in their health, and having been brought down to the lowest degree of prostration and marasmus—to a reconstitution, we may call it, of the solids and

liquids—have a devouring hunger. If, therefore, the keeper who looks after them unhappily forgets that the principal lesions or sores are seated in the stomach and intestines, and if he gives them too much solid nutriment, he impedes the cure, irritates the ulcerations not yet thoroughly covered over, and soon adds another victim to those which had already died.

This convalescence lasts from fifteen to twenty days, and the animal only recovers its health at last by slow degrees. Still the careful keeper need not be afraid of a relapse when he is patient and watchful.

Such, then, is the contagious typhus of the ox. Type of the unreturnable infectious diseases, its virulent miasms undergo within the structure a series of transformations: they produce in the frame a general disorder fully capable of annihilating the predisposition or aptitude of the animal to receive the taint. A disease essentially specific, it affects the principal centres of life; it kills its victim both by its deadly virus and by the local derangements to which it gives rise; for how is it possible to preserve life when the whole nervous sys-

tem, that promoter and regulator of all the functions, is upset?—when the lungs which revivify the blood, when the digestive organs which are the very sources of alimentation, are smitten with stagnation?—when, in fine, not only these vital centres have ceased to operate, but when each by itself is the cause of torturing pains and exhaustion?

The typhus, moreover, is observed in all animals of the bovine species, whatever may be their race, their age, or their sex. The recovered animals may live with impunity amidst diseased herds of cattle, thanks to its non-relapsive nature. Jessen has even witnessed cows which, after their own cure, communicated a sort of immunity to their offspring. For the same reason it is that epizootias are less fatal in those countries where they often occur, the constitutions of those animals which are engendered amongst such habituated herds, preserving a prophylaxy inherent to the blood which has been transmitted to them.

Besides, what a pregnant subject is this for the physician, and what more meritorious task can he set himself than the treatment of

such a distemper, which reason assures him must eventually lead to the cure and eradication of the same complaint in the human species?

From a cause which as yet has been indistinguishable and imponderable, what important, what marvellous results loom in the future! The air seems to us pure and wholesome, yet it conceals a typhic miasma of the most deadly kind; it carries this pernicious principle into the richest meadows, where we see feeding flocks and herds which to us seem exuberant with health. Then this miasma is inhaled and absorbed, and it meets in the frame the special and indispensable organic element which is needed for its multiplication; there it undergoes certain latent transformations, and a fermentation, a germination, which we call *incubation*, in order to explain a process which we cannot understand. Then fever is kindled, all the functions are disturbed, and the sick animal is struck down, leaving us wondering, ignorant, and powerless spectators in the presence of phenomena which, nevertheless, are the eternal work of nature and have endured through all time. — But if

in the invisible typhic atom nature gives us death, it also gives us life in the zoosperma.

II.

Lesions found in the Bodies of Oxen after Death.

The description which we have given of the disorders produced in the different functions by the operation of the typhus, may easily suggest what must be the lesions exhibited by the organs of the body.

Death, we have said already, may overtake the disease at any of its periods, and thus show every aspect and every degree of the organic lesions. Such an animal being struck down at the period of initiation, will not, of course, present the changes and varieties of the period of decline, and *vice versâ*.

In general, the state of the dead bodies is that of the most decided marasmus; the remains are intensely repulsive, as well by the stench they emit as by the sight they afford; and, in summer especially, decomposition sets in with great rapidity. Consequently, the utmost care is required in conveying

them from place to place; and this attention is the more essential, because in the transit, the cavities being deprived of their contractile power, let flow the pestilential liquids which they contain, thereby infecting the carriages and public roads. The urgent necessity there is to inhume at once these dead bodies, the most active agents in diffusing the contagion, is equally the drift of this observation.

The deceased animal, as a subject of anatomy, enables us to certify the seat of the emphysematous tumours, and to see that they are really due to the air which insinuates itself into the cellular tissue, and which, receding from the pressure of the fingers between the cells, produced the crackling sound we noticed above. This penetration of the air is, moreover, a far more general effect than was supposed.

It is ascertained, likewise, from the examination of these subjects, that the round, fluctuating, and smaller tumours, are indeed purulent gatherings, which occasionally find a passage into the layers and interstices of the muscles.

The muscular flesh is usually flabby, blood-

less, unsightly, of a very nauseous smell; and it would be difficult to imagine that the most avaricious trickster would dare to offer even the most presentable parts of it for sale and consumption. But when the expedients and artifices known to the butcher's trade are had resort to, when, regardless of the public health, the unprincipled dealer selects the most fleshy parts, when he dresses and adorns them by colouring them over with the blood of a healthy beast, the unwary eye of the purchaser may be deceived. Observe, that we are now speaking of cattle that have died in the last stage of this marasmus, so that we might suppose, even if the many summonses before the magistrates, and the too moderate fines which have been imposed on the guilty parties, had not shed the broadest light upon the fact, that *a large number of sick cattle which had been slaughtered at different stages of this frightful disease, have been dressed and adorned, exposed for sale, sold, and eaten by a very large portion of the inhabitants of London and of the country likewise.*

Digestive Channels.—The mucous membrane of the buccal cavity is, for the most part, of a

livid whiteness ; ecchymosed stains, and sometimes ulcerations, differing in their form and number, are visible on the floor of the tongue. Mr. Simonds has had an anatomical model constructed, which presents a perfect type of these ulcerations, some of which are of a scarlet hue, with perpendicular edges. The *stomachs* exhibit a variety of ulcerations.

The *paunch*, or first stomach, always contains a large quantity of food intended for rumination ; sometimes these aliments are dry, and lie sticking to its sides ; at other times they are diluted with water which had not yet been absorbed after drinking. The inner membrane of this first reservoir may show flat spots, with livid injections of different sizes.

The *honeycomb*, or second stomach, generally exhibits the same injuries as the paunch.

The *manyplies*, or third stomach, contains between its laminæ hard, pulverulent, and dry alimentary substances, which are seen sticking to the different leaves. On removing these substances, some ecchymosed spots are laid bare, the epithelium of which easily peels off ;

sometimes ulcerations, and even perforations, are visible.

The *reed*, or fourth stomach, whose sides are thicker, more fleshy, and more vascular, exhibits within its folds various kinds of lesions or sores: they consist of large flat stains of a darkish red, more or less soft, and sometimes ulcerations red on their deep surface, with clean edges.

As for the intestines, properly so called, the *duodenum* shows the same injuries, but most generally large ecchymosed spots.

The *small intestine* appears on the outside, even when it preserves its place in the abdomen, of a reddish colour, lined with vessels distended with blood, the signs of a general congestion of its membranes. The examination of the mucous membrane, after it has been cut open lengthways, shows, indeed, that this portion of the digestive tube is the principal seat of the distemper; for, independently of this general injection, you perceive ulcerations which have succeeded to detached pustules or lengthy flat spots, the result of a cluster of several of Peyer's glands, brought together by the plastic influence of inflamma-

tion. These flat spots, or wafers, very similar to those we observe in the typhoid fever of man, are inflamed and ulcerated in different degrees.

The mucous membrane of the *large intestine* exhibits lesions depending on the period of the disease. About the third period, the injection is sometimes general, especially near the rectum; but in the fourth and last period we often meet with ulcerations which are smaller in the upper part, larger and deeper about the lower or rectal part. The membrane of the sexual parts of the cow is strongly injected, and of a dull red colour.

As we have seen, the different organs of the digestive apparatus may, in this typhus, offer to view extensive alterations perfectly consistent with the gravity of the symptoms or the functional derangements. In two cases in which disorders of the respiration had prevailed, and which had been sacrificed on the eighth or tenth day of the disease, we only observed partial injections of a very limited character, either on the gastric membranes or on that of the intestine, and which

might have been detected in the case of common intestinal inflammation. Therefore, in these two cases, the characteristic lesions of the typhus, if they must be localized in the intestine, were, so to speak, absolutely wanting. It was, we will not say exactly the same, on four other animals, three oxen and one cow; but if, in two of them, the fourth stomach was inflamed, if in the third the small intestine was congested, and if, lastly, in the cow the large intestine showed ulcerations, we could not in these lesions distinguish those of typhoid fever.

These facts struck us with great surprise, for we were far from suspecting them. We hoped, on opening the intestine of these animals, which had certainly all died of the typhus, to meet assuredly in a determined spot some well-known lesion declared beforehand. To our great astonishment, such has not always been the case. So that our theories, conclusive as they seemed on the identity of the ox typhus and the typhoid fever in man, and which more than anyone else we wished to see confirmed, must submit to observation.

In fine, in this epizootia the intestinal lesions

or sores present different appearances. Developed to the utmost in some cases, so much so as to exhibit ulcerations at the root of the tongue as well as in the intestines, and to be in a manner the excess of the injuries which are seen in typhoid fever, they are in other cases scarcely perceptible, and sometimes entirely absent, when the animal is struck down in the third or fourth period, that is to say, when the exanthematic or pustular state has had time to develope itself on the digestive channels. One of these animals seized by Mr. Tegg at the Camden Town market, was in such a state of exhaustion that he could not be driven to the slaughter-house, only two hundred yards distant; they were forced to fell him on the spot midway, in order to have him conveyed to the place of dissection. We only detected partial injections on the digestive tube of this beast. The pulmonary emphysema which had caused this animal's death was developed in the highest degree.—He was opened at the request of M. Bouley, of Alfort.

Apparatus of Respiration.—Here, again, the

typhus shows us injuries which differ from those of typhoid fever; for if the breathing is always more or less obstructed at the outbreak of this fever, no serious organic change in the lungs is the consequence thereof. In the ox typhus, on the contrary, when the pulmonary form prevails, the derangements of the respiratory organs are remarkable. Thus, the mucous membrane of the nostrils, from which flows a purulent and fetid mucus, is sometimes ulcerated and excoriated. The larynx and the trachea or windpipe, choked up with frothy mucus, show the same alterations, though less frequently. The lungs, which are rather congested than inflamed, are emphysematous, the air having entered and distended the cellular tissue which unites the lobes together.

In some cases, the lungs are so gorged with air that their lobes constitute but a single heap, rendering them irreconisable, so greatly do their volume, their specific gravity, and their spongy aeriform aspect differ from the natural state.

Apparatus of Circulation.—The inner sides

of the heart show ecchymosed spots, and the same is the case with the larger vessels. The blood, diminished in its quantity and altered in its quality, is blackish and more fluid; but in most cases it coagulates instantaneously and in a mass, without separating into its solid and liquid parts.

Nervous System.—Having observed and dissected the dead bodies at the slaughter-houses of the markets, we were not able to examine either the brain or the spinal marrow. Besides, let us remark in this place, that the mode of felling cattle in England would have rendered impossible such an examination. For the animals are struck with a club, which kills them both by cerebral concussion and by the direct alteration of the brain; the instrument having a sharp end which perforates the skull and injures the cerebral lobes. Nor is this all; the moment the animal is struck down, a flexible rod is inserted into the hole made in the skull, and driven as far as the spinal canal, so as to tear to pieces the protuberance and the bulb, that is to say, the vital knot. This manner of killing cattle seems to us, how-

ever, preferable to the one adopted in France, where the animal does not sink till he has been struck repeatedly with the club.

But be that as it may, those authors who have examined the nervous centres of horned cattle which had perished victims of the typhus, have usually found the meninges, or membranes that envelope the brain, injected, whilst the brain itself was slightly dotted over with blood.

These anatomical lesions of the nervous centres being insufficient of themselves to explain the death at the second period, we have endeavoured to give the explanation of it in treating of the symptoms.

The other organs, the spleen, the liver, the kidneys, present alterations of a secondary interest only.

III.

Diagnosis — Prognosis — Use of the Flesh of Animals which have Died of the Typhus — Danger of direct Absorption.

The typhus of the ox has such distinct and strongly marked characteristics that it is not

easily mistaken. However, to conform ourselves to received custom, I will say some words about the principal symptoms of some distempers affecting the ox, between which and typhus unprofessional persons might be embarrassed, and hesitate to distinguish them. We will transfer, however, those particulars pertaining to the diagnosis to the part written for the special use of agriculturists, farmers, and graziers, in order that they may readily find whatever it may be necessary for them to know when they chance to have any sick and tainted cattle to treat and cure.

We have likewise a few words to say on the subject of the prognosis of the disease, as regards its propagation and its time of lasting. Finally, we will unfold a question of very real importance in hygiene—we mean the use and consumption of the flesh of animals as food, and the danger which may accrue to man and other animals from contact with their dead bodies, or fragments of the same.

The diseases of the ox, which we are accustomed to consider as distinguished from typhus, are the contagious peripneumonia, the

apthous fever, and the "charboneux" typhus; but, as we have just said, we will mention by-and-by their chief characteristics.

Everyone is anxious, and natural indeed is that anxiety, to know what this epizootia will become—what will be its course; how long it will last; whether it will extend its ravages over the whole extent of the three kingdoms; and if, in fine, it will invade all Europe.

To answer in a precise manner these questions would be a difficult task; for who amongst us can assign at present any definite course to the atmospheric variations? and yet they have a genuine influence on the progress of the epizootia. On the other hand, the measures which have been taken hitherto to confine the contagion to its different foci, have unhappily proved almost ineffectual, but it may be hoped that, assisted by experience, we shall be able to resist the evil more effectually, and check its propagation.

If the atmospheric conditions and the preventive measures could not modify the spread of the distemper, we should have reason to

dread a still greater extension of the contagion ; for the virulent character of the epizootia appears to be of an exceptional intensity, and we may perhaps compare it with the famous epizootia of the middle of the eighteenth century, which for ten years afflicted all Europe with its ravages, striking down six millions of horned cattle.

Let the reader cast an eye over the extracts borrowed from the physicians of the principal faculties who have described this typhus, and which we have reproduced in the first part of this book relating to its history, and he will then be convinced that the disease is absolutely the same as that which then raged so fiercely. And if that is the case, we must anticipate that it will extend its ravages whilst prolonging its duration. Already it has spread to Holland and Belgium ; Hungary and other provinces in the south-east of Germany—a fact much less surprising—are likewise smitten with it ; and now we hear the news that France, though so vigilantly on her guard, has seen her frontiers passed over. In spite of the *cordon sanitaire* which she had prudently established

everywhere, some horned cattle have been seized with the typhus at the town of Raubaix, in the north.

Without setting ourselves up as pessimists, let us declare that we must expect that the contagion will continue to spread. Let us make up our minds to this, in order to take the necessary sanitary measures, and set ourselves seriously to work by trying the preventive treatment. But, alas! between the Government, the municipal corporations, the agricultural societies, the cattle proprietors, and, with regret we add, the veterinary surgeons, there has been sadly wanting, up to the present time, that mutual understanding, that prompt and decisive action, and those pecuniary advances which are so necessary to encounter and contend with this great calamity.

As for estimating with any approach to accuracy the sacrifice of property, the pecuniary loss, which this fatal epizootia may occasion the country, the want of exact statistics as to the number of cattle which have already been struck down will not permit us to do it.

But we may, perhaps, already set it down approximately from 50,000 to 60,000 head of cattle for England and Scotland, until we have obtained more precise statistical information on this significant point of inquiry.

That would represent, however, a very considerable capital; for if we compute the loss of each animal at the average sum of 15*l.* only, the sacrifice already incurred would not be less than from 750,000*l.* to 900,000*l.* This sacrifice in money might possibly have proved the be all and the end all; and at this point we might, perhaps, have arrested the contagion, had we all been able to act advisedly and harmoniously together, in the name and for the interest of the public, from the first appearance of the disease. But this calculation of, let us say, 900,000*l.*, is made on the supposition that each cattle owner had been willing to abide by his own loss; whereas, unfortunately, many of them have striven to shift it on others, and large numbers of the sick and tainted beasts having been sold and consumed, a proportionate sum thus recovered by those avaricious men must be of course *deducted* from this estimate. Deducted, indeed! Considering the conse-

quences on the public health, is it not rather an aggravation than a mitigation of the loss?

These last assertions naturally lead us to inquire whether we are not justified in saying that the flesh of sick and tainted cattle, thus circulated and consumed, has not had its baleful effects on the public health.

The butchers who sold the flesh of these sick and tainted cattle have no doubt been careful to abstain from using it in their own families ; and the first time they speculated on the health of their fellow-citizens, well knowing what they did, their conscience probably reproached them with the misdemeanour. But afterwards, when no bad consequences to their customers had been seen, their own impunity, joined to this apparent harmlessness to their neighbours, rendered them bolder, and it became a daily habit with them to sell this peccant offal, which poisons even the earth by its contact.

Moreover, the graziers themselves were in league with the butchers, and took care to slaughter the affected animals before the wasting of their flesh by the progress of the distemper had bereft them of their greatest

value. Their private interest prompting them thus to dispose of the sick animals as fast as they could, the majority of the tainted beasts were sold and eaten in the second stage or period of the typhus.

Now, if the flesh of these diseased animals had been eaten raw, accidents most terrible and appalling would certainly have been the consequence, although dogs may have fed upon it without injury. But the cooking of animal flesh at 100 degrees of heat has the property of destroying for a time the septic germs, as the famous debates now being held by the experimentalists who are studying the subject of spontaneous generation tend to show. This poisonous meat, therefore, may at first have been digested without producing immediate ill effects.

Our medical practice, however, authorizes us to declare that, after making every allowance for the influences of this extraordinarily hot summer, digestive and nervous complaints of the acutest description, and without any special cause to account for them, have been very numerous indeed during the last two months, and beyond all proportion greater than they

usually are in London. And we cannot but feel that, if the cholera should reach the shores of England at this critical conjuncture, it will find organisms most ready to receive its virus. Then, indeed, if the typhic miasma come to mix and blend with the choleraic miasma, all living beings will have to contend with the most deleterious causes of alterations in their health, and we may (God send it be otherwise!) witness one of those measureless calamities which, known in former ages as the *Black Pestilence*, decimated cattle and men indiscriminately, and which, when we read the sorrowful accounts of it in history, make the flesh creep with affright.

We sincerely hope that such misfortunes may be spared us. But ought we to abstain entirely and absolutely from consuming the flesh of cattle smitten with typhus? It is a delicate question, but still we shall answer it, making due allowance for every interest concerned.

We conceive that all animals which are smitten with the early effects of the disorder, which begin to operate at the opening of its second period, that is to say, when the first

symptoms are declared, such as stupor, loss of appetite and shiverings, may be handed over to the butchers. But this must only be done on the *positive understanding and condition* that every animal, sick or not sick, in times of epizootia, shall pass, either in the farm, the market, or the stable, under the examination of a competent veterinary inspector, who shall mark the beast when fit to be sold for consumption. With this precaution, which at present is put in practice in Belgium, every interest is cared for and guarded—those of the public health as well as those of the cattle owners.

But there is another question of some importance which deserves to fix our attention for a moment. People sometimes inquire whether the ox-typhus can be communicated to other animals, and even to man, either by contact, by direct absorption, or by inhaling the miasma floating in the atmosphere.

Experiments of great interest might be made on this subject; but we can already assert, on the evidence of facts publicly known, that the direct absorption of putrid matter and purulent secretions, and likewise the mere

contact with tainted flesh, when the epidermis or scarf-skin is cracked or peeled off, or when the least open sore exists, may give access to the disease, and produce death, both in man and other animals. In these cases, the absorbed virus operates, not as a specific agent, giving birth to typhus, but as a provocative septic agent, endowed with infectious properties, which infuse into the economy a germ of virulent and mortal disease. So long as a sound and intact outer skin stands as a safeguard between us and absorption, we may fearlessly touch and handle the tainted flesh of these animals. But the slightest sore or abrasion is an open door to let in death. A young veterinary surgeon, who had a slight wound in one of his arms, was carried off within forty-eight hours, as was proved at a coroner's inquest, after he had dissected an ox which had died of the typhus.*

* Another instance of the fatal effects of the terrible disease now ravaging our flocks and herds of cattle, and resulting in the death of a veterinary surgeon, has just occurred in the town of Sudbury, Suffolk.

Last week the epidemic made its appearance in the stock-yard of Mr. Ruffell, farmer, Melford, and the cases were attended by Mr. Robert John Plumbly, veterinary

We see by this fatal example that we must be particularly careful not to touch an ox tainted with typhus when we carry about us

surgeon, Sudbury. On Thursday a cow, which was evidently suffering from the disease, was brought out and shot by Mr. Plumbly, who afterwards made a partial *post-mortem* examination of the carcase. In doing so with a small scalpel his shirt-sleeves became saturated with blood; &c. from the animal. He returned home, and the same day was attacked with sickness and acute pains in the head and chest, accompanied with a soreness in the bones generally. On the following day he appeared somewhat better, and was able to attend to his duties, but became worse towards evening, and was confined to his house on the following day. He considered that he was merely suffering from the effects of a severe cold, and did not call in medical assistance till Saturday night. He slept well that night, and seemed somewhat better on Sunday morning. About two o'clock in the afternoon he got out of his bed to have it made, when he appeared comparatively strong and in good spirits; but almost immediately afterwards he was taken in what seemed to be a fit, and expired in a few minutes, before the surgeon, who only lived next door, could come to his assistance. It was thought that death had resulted from apoplexy, and a medical certificate to that effect was given. Rumours, however, soon becoming current that Mr. Plumbly's death was caused by the cattle plague, the borough coroner (R. Ransom, Esq.) directed a *post-mortem* examination to be made. But, by this time, so rapid was the spread of the virus through the system that the body appeared perfectly plague-stricken, and by Tuesday morning, when the surgeons arrived to examine it, and

any open sore, unless we take the utmost precaution in order to guard against all direct contact or absorption. Man, as we have said

it was taken out of the coffin, the corpse scarcely retained the semblance of a human being, the head and trunk being much swollen and black in colour, the features quite undistinguishable, and all the flesh converted into a putrid jelly-like mass. The tissues were completely disintegrated, so that it was utterly impossible to make any examination.

An inquest was held on Tuesday afternoon, at the court room, Town Hall, before the coroner, R. Ransom, Esq., and a jury; Mr. Joseph Barker, chemist, being chosen foreman. The mayor (S. Higgs, Esq.) and other gentlemen were present during the whole of the inquiry, which lasted four hours.

The jury went and viewed the body, which lay in an outhouse, but were so overcome with the fearful spectacle that they were permitted by the coroner to retire to partake of stimulants before they could further proceed with the inquiry,

The first witness called was Mr. William Brown, veterinary surgeon, and partner with the deceased, who deposed to having gone with him to Mr. Ruffell's farm at Long Melford, on Thursday last, to examine several cows down with the cattle plague. One was brought out and shot by the deceased, who proceeded to examine the intestines and viscera, which did not present the appearances usually observable in advanced stages of the disease, there being but slight ulceration of the coats of the stomach and bowels. The lungs were not examined, as the deceased had only a small scalpel with him. In making incisions in the body the shirt-sleeves of the

and shown, breathes with comparative impunity an atmosphere laden with the infectious miasma of this typhus. But that which to-

deceased became covered with blood, but he did not prick or cut himself.

Henrietta Dansie, nurse, was examined, and said that deceased had been suffering from boils on his right arm, one of which she had poulticed on Wednesday, the day before he had examined the diseased animal. He removed the poultice himself, but declined to put on a plaster as the place was a small one, although not healed. He changed his linen on his return from Melford ; but the same afternoon he was taken with sickness and vomiting, and complained of acute pains in his head and bones. On Sunday afternoon, shortly before he died, he wished to have his bed made, and got out and stood whilst it was being done. He then complained of faintness, and got into bed again, and witness to revive him washed his face and hands ; in doing so she observed that the nails of one of the hands which had lain in the bed were turning black. She was about to give him some pills when she noticed a sudden change come over him ; and thinking he was going to faint or have a fit, she rang for assistance and went herself for the doctor, who, being from home, another surgeon residing next door was called in, but by this time the unfortunate gentleman was quite dead.

Mr. Maurice Mason, surgeon, said he was called in to see the deceased the night before he died, and visited him again on Sunday morning, and ordered him a lotion and leeches for his head and effervescing drinks (the leeches were not applied). From the appearance of the body and the evidence which had been adduced, witness

day is true may not be true to-morrow; let us, therefore, be also on our guard against the too continuous absorption of an atmosphere impregnated with these deleterious principles.

As for herbivorous animals in general, a similar organization must, in their cases, predispose them to receive the contagion. Whenever we visit the markets, we cannot help fearing to see the ox typhus communicated to the sheep and pigs which are stationed around them. It is an unquestionable fact that, in certain epizootias, all animals without distinc-

was of opinion that the death of the deceased was caused by the absorption of poisonous virus from the dead beast.

Mr. W. B. Smith, surgeon, gave similar evidence, and added that the tissues of the body were so disintegrated that it would have been utterly impossible to have made a *post-mortem* examination.

After half an hour's consultation the jury returned a verdict, "that deceased died from the effects of the absorption of virus or poison into his system upon the occasion of his making a *post-mortem* examination of a cow which had died from a certain disease called the cattle plague."

The sad occurrence has caused much sensation in the town, the deceased, who was only 23 years of age, being well known and much respected.

tion have been smitten and struck down, and the herbivorous animals more rapidly than any other. The habit of collecting such vast numbers of cattle in the same market, and on the same day, though convenient for business, appears to us injudicious, especially during the prevalence of this scourge.

This part of our treatise was in the printer's hands when Mr. Simonds wrote a letter to the Privy Council which justifies all our apprehensions. The typhus of the ox has been communicated to a number of sheep, and we must all expect to see this cruel disease assume much larger proportions than heretofore, since it has now obtained a second focus for its maintenance and dissemination.

“ Veterinary Department, 23, New-street,
Spring-gardens, Sept. 25th.

“ SIR,—I beg to report that, acting on the instructions received from you to investigate without loss of time the statement received at your office relative to an outbreak of the cattle plague in a remote part of the county of Norfolk, supposed to have arisen from cattle having been in contact with some diseased sheep, recently brought to the premises, I have visited the district in question, and inquired into all the circumstances of the case.

“ It appears that as far back as the 17th of August

Mr. C. Temple, farmer and merchant, of Blakeney, received on his farm 120 lambs which he had instructed a dealer to procure for him for feeding purposes.

"The lambs were bought at Thetford-fair on the preceding day, and were immediately sent by rail to Fakenham, from which place they were driven to Blakeney, a distance of about ten miles. On their arrival they appeared to be fatigued to a greater extent than ordinary, which was, however, attributed to the heat of the weather and the exertion the animals had undergone.

"In addition to this, the shepherd observed that several of them seemed unwell, and he remarked to his master that they did not appear to be a 'very healthy lot,' and that he thought it would be better to return them to the dealer. Within a day or two of this time the symptoms of illness were more marked in all the original cases, and many more of the animals had been attacked. On the 24th two of the worst cases were removed from the field to the farm premises, and were placed in a shed for treatment, in which afterwards a cow was put. On the 25th two of the lambs died, and in consequence of this, and of the large number which were now affected, the whole were brought, on the morning of the 27th, into the same yard where the shed previously alluded to was situated. There is also another shed, separated from this yard only by some old furze faggots, into which the cows were driven night and morning for being milked. The lambs remained in the yard till the morning of the 28th, when having had some medicine administered to them, they were returned to the fold and never came again near the cows.

"While in the yard three died, two on the 27th, and one on the 28th, and on the following day two others died in the field. From this time the disease went on,

so that by Friday last, the 22nd of September, the day of my visit, forty-six had either died or been killed, and twenty-seven were in a very precarious condition.

"On the 7th of September, ten days after the last exposure to the sheep, a cow gave evidence of being affected with the cattle plague, this animal being the one which had been put into the shed occupied by the diseased sheep on the 24th of August. A second cow was attacked on the 11th of September, and a third shortly afterwards, which was followed by others ; so that by the 16th all the cows, six in number, a heifer, and a calf, were all dead.

"My examination of the lambs showed that they were unmistakably the subjects of the plague. The symptoms agreed in almost every particular with those observed in cattle affected with the malady, and the *post-mortem* appearances were also identical.

"With a view to ascertain the true nature of the changes produced in the system prior to death, I had four of the lambs killed, and from these I took some diseased parts and forwarded them to the Royal Veterinary College without note or comment. These parts were examined by my colleague, Mr. Varnell, who at once recognised the special changes of structure which are caused by the cattle plague.

"The whole facts of the case leave not the least doubt of sheep being liable to the disease termed the cattle plague, and that when affected they can easily communicate the malady to the ox tribe ; and moreover, that when so conveyed it proves equally as destructive as when propagated from ox to ox in the ordinary manner.

"The case is also more important from having occurred in a place no less than fourteen miles distant from any other where the cattle plague exists, thus placing beyond a doubt the fact of the malady being introduced among the cattle by the sheep alone.

"I regret to add that this is not a solitary case of sheep being affected by the cattle plague. I learned that some sheep were supposed to be similarly affected belonging to Mr. R. J. H. Harvey, M.P., on his estate at Crown Point, near Norwich. This place I also visited, and found a large flock of upwards of 2000 lambs, among which the malady was prevailing. A large number had been separated from the diseased, and gave no evidence of the malady. Very many, however, had died, and the disease was making rapid progress. I also examined many of the dead, and found the *post-mortem* appearances to be identical with those seen in the other cases spoken of in this report.

"In this instance the malady was brought into the estate by the purchase of some cattle, which afterwards died from the disease, and which were unfortunately pastured with the sheep at the time the disease manifested itself.

"The whole matter is one of the greatest importance, and which I lose no time in submitting to you for the information of the Lords of the Council.

"I have the honour to be, Sir, your most obedient servant,

"JAS. B. SIMONDS."

IV.

General Considerations on the Ox Typhus, and the Recapitulation of the Symptoms.

We have seen the causes, the symptoms, and the cadaveric alterations of the Bovine typhus, and we may therefore apply ourselves

at present to the consideration of its pathogenia and its nature. Only, the limits of this book will not admit of a complete discussion of every point of this important question of pathology; for if we desired to show in what respect the typhus differs from, and in what respect it resembles, such and such a morbid entity, febrile, infectious and contagious like it, such a dissertation would require a whole volume for itself; we are therefore obliged to keep within certain limits.

Like every watchful physician who has applied himself to the study of comparative pathology, we entertained our own preconceived opinions as to the nature of this *Cattle Plague*. Arguing *à priori* from what we knew, from the laws of the pathogenia of those exanthematic diseases which we have alluded to in a former chapter; from the identity of variola in various animals; from the preventive treatment to which this identity has led; believing that animals and man have each their typhoid fever, as they have their variola or small-pox; considering with the *Ecole de Tours*, typhoid fever as a variola of the intestinal mucous membrane, and having proposed,

in 1855,* to adopt inoculation as a preventive treatment, drawing an easy comparison between the typhus we are now observing and the typhoid fever in man; hoping, we may say, indeed, to find in this typhus the inoculative and preventive virus which is required for our typhoid fever, all will understand with what eager and vivid curiosity we have examined the entrails of the victims struck down by this epizootia. For, if this typhus had been a genuine typhoid fever, the bovine species which has already provided the preventive virus for small-pox, would equally have afforded us the preventive virus for typhoid fever. In this hypothesis, our proposal to inoculate the typhoid fever, which up to this time has been tried on horses only, and in experiments badly conducted, by pupils of the Veterinary School of Lyons, was perhaps on the eve of being realised. But we regret to

* "Appel à des Expériences dans le but d'établir le Traitement Préservatif de la Fièvre Typhoïde et des Maladies infectieuses inépidémiques, par l'inoculation de leurs produits morbides." *Memoire lu à l'Institut, le 8 Octobre, 1855. Inséré dans la Gazette Hebdomadaire de Médecine. Paris.*

say, we have been forced to submit to evidence, and to acknowledge that the present infectious typhus is not the one we require to provide us with the anti-typhoid virus.

In the same manner as pathologists disagree as to the question, whether the typhus and typhoid fever in man are one and the same disease, so should we long debate, without coming to an agreement, as to that which relates to the typhus and typhoid fever of the ox. We cannot pretend to produce a reconciliation between these dissentient schools; all we desire, is to sum up what observation has suggested to us, on account of the practical and therapeutic interest belonging to the subject.

For ourselves, the typhus and the typhoid fever of the ox are two diseases of the same order, but nevertheless distinct; and the reasons upon which we ground our opinion are suggested to us by the nature of the intestinal lesions, the symptoms, and causes of these distempers.

As we have already seen, the contagious typhus of the ox, at least that of the present

epizootia, is an infectious disease, which varies in the intensity of the functional disorders and the cadaveric lesions to which it gives rise. The typhoid fever, we mean the real one,—for there are other intestinal exanthematic fevers which simulate it,—always localize on the small intestines a pustulous exanthem, and in the typhus of the ox, this pustulous exanthem and the ulcerations by which it is succeeded, are frequently wanting.

The real typhoid fever springs up in every country under the influence of local causes, and is not in the same degree infectious and contagious as the typhus proper. In fine, the typhoid fever smites many species of animals—the horse, the pig, etc., without transmitting its contagion with the same intensity.

The contagious typhus of the ox appears to be more especially proper to that animal; for in those latitudes where it develops itself other animals are not affected by it.

For these reasons, then, to which we could easily add many others, we consider the typhus of the present epizootia a special and distinct type of typhic diseases, and differing from the

typhoid fever: it is the highest expression of its class, and occupies the first degree in the scale of infectious typhic diseases. Next to it we should place the typhoid fever, which we admit is not often found in the ox. But veterinary pathology is still less understood than human pathology, and typhoid fever may perhaps be recognised in those diseases which the former science has described under the names of *adynamic* and *ataxic fevers*. Besides, a persistent research among the veterinary memorials and reports might possibly enable us to discover some instances in which the real typhoid fever in the ox had been traced, apart from the epizootic conditions. Here is an instance of it:—

Gellé, in vol. i. page 245 of the *Pathologie Bovine*, quotes the following abstract which had been forwarded to him by one of his brethren, on the dissection of an ox, which was made on the 10th of May, 1824:—

“*Duodenum*.—Uniform redness of the mucous membrane, with thickening, softening, and petechial spots. In the middle portion were discovered some of Peyer’s glands, small

round pustules, whitish at the top, with a reddish circumference. In some parts contiguous to these pustules lay ulcerations somewhat extensive, which seemed to be the result of the softening of the pustules which had preceded them. A dark pus issued from these ulcerations. The inflammation by which they were attended was diffused in some places, whilst in others it was circumscribed. In some parts the intestinal mucous membrane was utterly destroyed. The mesenteric glands were red and soft."

Gellé adds:—"I have recorded this interesting narrative, as it may perhaps serve hereafter to throw light on a point of doctrine."

The intention which Gellé nurtured at the time, is, we see, now fulfilled conformably with his object.

The contagious typhus of the ox not being a real typhoid fever, we shall not, consequently, be able to borrow from it the preventive virus for that disease in man. But if these diseases differ, and if it is difficult, in the present state of science, to assign to them

such distinct characters as to produce a perfect agreement among all medical writers, we must, however, admit, that to designate the ox-typhus now before us by the generic name of PLAGUE, after the Germans, who have given it the name of RINDERPEST, would carry us too far back.

Let us acknowledge also, that the denomination of *contagious typhus*, adopted by the French veterinary doctors, is not, any more than the designation of TYPHUS FEVER, applied to it by English physicians, totally free from objection.

In truth, the various species of typhus whose characteristics we have already given (see p. 73), are all of them febrile and contagious. Whoever uses the word *typhus*, speaks of a contagious and febrile malady, inasmuch as we cannot conceive typhus without its accompaniments, fever and contagion. But as the prevailing characteristic of this infectious disease is, above all, its *contagion*, we have preferred to adopt the name of *contagious typhus*, without, however, deceiving ourselves as to the value of the denomination. The final

elucidation has not yet been found for these diseases; at some future day they will be methodically divided and arranged, and each of them will then receive a special title, which will remove from the mind that vague uncertainty which at present we regret.

But if some faults of doctrine are open to debate, no doubt whatever can exist in the mind as to the morbid individuality of ox-typhus, or the general conditions of its pathogenia; and we are able to deduce from the preceding explanation, the following conclusions as so many propositions definitively settled:—

1st. The typhus of the ox is a disease essentially infectious, which is produced by the absorption of the morbigenous miasma in the air.

2nd. This typhic miasma is absorbed and engendered by the ox, under the influence of a number of special deleterious causes.

3rd. When the miasma has been absorbed and incubation produced, the disease itself is but a supreme effort of nature—a struggle between the vital forces and the morbid evolu-

tion of the poison, in order to guard and defend life against the danger which threatens it.

4th. A malady essentially general, *totius substantiæ*, it directs its action, in different degrees, over the whole structure, but chiefly on the nervous centres, on the organs of respiration, and on the digestive apparatus.

5th. Its progress is regular; to the latest period of incubation it succeeds that of the general poisoning of the blood—that of the pyrexia of general fever—which for a time stops up all the secretions. Then, the morbid flux is localized according to particular predispositions: either on the nervous centres, when the animal is struck down at the outbreak; or on the lungs, when the respiratory derangements become the leading symptoms; or on the digestive channels, when the train of typhoid phenomena is observable.

6th. The period of acute inflammation, which had dried up the sources of secretion, gives place to that of the depurative and critical exhalations or secretions; from every mucous membrane, from every outlet, there issues a mucous discharge, which at first is thin

and clear, but afterwards becomes thick and purulent, and endowed with the most infectious properties. The intestinal mucous membrane, smitten with a particular lesion, becomes the seat of a flux extremely copious and intolerably fetid. Gases, and occasionally purulent deposits, are developed in the cellular tissue beneath the skin.

7th. The organism or physical frame, disturbed in the very centres of life, undergoes a general transformation, a kind of organic decomposition beforehand, and all the symptoms of reaction are followed by a period of wasting atony and adynamia, which usher in dissolution or life's extinction.

8th. Finally, throughout the whole course of the distemper, one special functional derangement—*stupor*—has been witnessed as the predominant symptom, the nervous system being in a manner annihilated in its functions in consequence of the general infection.

Such are, in a brief outline, the principal symptoms of this typhus, which, when once engrafted on the economy, pursues its fatal march, and no treatment can then arrest its

evolution. As in small-pox, so in typhoid fever and in most general disorders, Nature for a time must be allowed to exercise her new functions, which succeed each other in due course, and which the physician must not stop; for if he did, he would accelerate death; but he must watch with a vigilant eye, in order to assist the vital powers.

The medical man, satisfied with these facts, will therefore abandon the chimerical hope of finding a specific remedy for such a disease. The virus once absorbed, the frame will endure, and fatally endure, all the morbid phenomena which must produce and succeed each other. *Against such a poison no other antidote exists than the poison itself.* And this will be easily understood. What necessity have we for a specific remedy to resist a distemper, which carries within itself its preventive treatment? If it germinates and is propagated, let us not accuse Nature and render her responsible; our own blindness, the lack of a community of interests among the people, our social institutions, the still imperfect state of the exact sciences, &c., amply explain how

it is that we have not yet employed the effectual means we possess, not of curing it, but preventing it. If we could have our choice between prevention and cure, should we not naturally take the former?

Indeed, the sources, the causes which generate the typhic miasma, are thoroughly well known to us, and these we can avoid. The developed miasms hang suspended in the air; we may, perhaps, one day destroy them, if not in the outer atmosphere, at least in the stalls and sheds where the animals inhale and absorb them. In fine, if we are powerless to arrest the fell disease when its periods revolve, we may hope at some future time to act with greater efficiency upon it during its period of incubation.

On the other hand, if this formidable disease cannot be stopped in its progress, does it follow that we should not treat it at all? Certainly not! Far be such a heresy from our thoughts. What would be the consequence, if we left to their fate the sufferers from the small-pox, from typhoid fever, and from typhus itself, instead of watching over

them with the utmost solicitude? If the physician, the enlightened interpreter of morbid phenomena, did not direct them with a bold and fearless hand, but abandoned Nature to her helpless course, why, necessarily, every patient would die, whereas a large number are now saved.

That which is true in the case of man, is likewise true in the case of animals: we are bound to treat them when they are ill. If to-day we think it more expeditious and more profitable to exterminate them, we certainly neglect our duty. We are the sovereign masters of animals; they are the companions of our toils and pleasures, their lives must be given to preserve our own; but on their well-being and their happiness our own well-being and happiness also depend. They will return to us the sufferings and diseases of which they die a hundred times over. Like ourselves, they die of consumptive, tubercular, cancerous, eruptive, typhoid, and parasitical diseases. And who can tell whether they have not communicated these disorders to man, who was, perhaps, originally exempt from them; and

whether they do not continually communicate them to him?

What noble pages might be written on the close connexion which exists between all organized beings, both physically and morally! Let us love these animals, let us treat them with kindness, and all our other qualities will be raised by so doing.

But as a man must belong to the time he lives in, we will take up for a moment with the doctrines of the economists; we will tolerate the extermination of diseased animals, as a painful necessity. Our duty is to seek in the study of the diseases of animals *and in their cure*, the cure of the disorders which afflict the human species. We shall, therefore, now proceed to consider the subject of the treatment of horned cattle, both as relates to preventive and curative medication.

CHAPTER IV.

Treatment and Cure of the Ox-Typhus.

In now addressing ourselves to the treatment, and, as far as human agency can effect it, to the cure, of this insidious distemper, we cannot conceal from ourselves, that this is the most difficult, the most delicate, and, at the same time, the most important division of our work; for it is to this part, above all, that attention will be directed. This portion of our task, therefore, will prove especially arduous; and nothing can give a better notion of the difficulties we shall have to encounter than the many fruitless attempts which, for several months past, have been made to overcome them by many ardent inquirers, stimulated by the best possible intentions.

This, then, is the moment—if we may be allowed the metaphor—to take the bull by the horns; and we do so without hesitation. If, like so many others, we are baffled and overcome in this unequal struggle—if our

strength is not on a level with our desires—we trust we shall be pardoned.

Several paths leading to the same end may be followed in this exposition of the treatment of ox-typhus. After mature reflection, we shall adopt the one, which will allow us to take the disease at its birth, *ab ovo*; to study it in all its phases, in its first and second causes, and then in the successive periods of its development.

In this manner, we shall be able to give an account of each fact of real importance mentioned in the foregoing pages, and to comprise within the treatment whatever is connected either directly or indirectly with the disease.

Thus we will relate in so many separate articles,—

1st. The means and measures to be employed to meet and resist the first local causes which may generate the typhus, then the secondary causes which serve to propagate it.

2nd. The means of preventing the spread of the disease to animals still in good health.

3rd. The means of treating it at its different

periods, from the period of incubation to that of its decline.

4th. Finally, we shall insert the laws and sanitary regulations which have been published in England relative to this disease.

As will be seen, by adopting this method, the whole matter will be considered consecutively and in regular order ; and the reader will understand that when such a phase of the malady is developed it is because the preceding one, which is the cause of it, has not been effectually contended with.

I.

Means and Measures to be employed to resist the Causes of the Contagious Typhus of the Bovine Species.

We have shown fully and explicitly in what countries of the globe, and in what particular conditions, the typhus is generated among oxen. We know that this dire disease has its focus on the banks of great rivers or lakes, which are periodically overflowed, and on which is deposited a slime teeming with organic

matter; in marshy plains, where the same natural impurities are fostered; and that these first hotbeds of the evil are found in China, in India, in America, in Africa, as well as on the shores of the Black Sea. A spirit of observation which delights in measuring the phenomena of nature with the contracted compass of its own short views and conceptions, could alone have imagined that the ox-typhus was only to be found originally in the steppes of Hungary and Russia, and that the bovine species of those countries, thanks to a special organization, was alone capable of generating the typhus.

Since we know, then, in what conditions this disease is developed, and especially in what manner it is propagated in Europe, it is not impossible now, when nations are united by the means of quick and easy communication, by commercial treaties, and by the mutual relations of science, to examine what measures might be taken to modify and control these conditions. A commission formed for this purpose, a scientific congress, would be able to make on the spot a study of all the circum-

stances which favour the development of typhus, and the result of their reports would enlighten the peoples as to the causes which produce it and from which they are first to suffer. They would be recommended to choose as pastures the healthiest places, to withdraw their cattle at certain seasons from those plots of ground which are baleful to them ; new systems of agriculture would be planned and tried, &c. These questions being carefully examined, might lead to important results ; nor can we understand how, in the age in which we live, the same indifference and apathy as prevailed in the past should be maintained in presence of the positive and permanent causes of this infectious disease, whose contagion, as we now see by many proofs, may extend at once to so large a portion of Europe. There is now something to be done in this matter ; it is the duty of the governments to deal with it effectually, and to take serious measures to destroy the evil radically, if radically it can be destroyed, and, if not, to alleviate its pernicious effects as much as possible.

Moreover, many breeders of cattle have not waited until now to guard against some of the

first causes of the typhus: already they give the animals rock salt, ferruginous and arsenical preparations, but all this is done without method, and according to each man's will and pleasure. It would, therefore, be necessary to institute regulations, and to see them carried out and practised under the superintendence of public functionaries, armed with sufficient power and authority.

These measures having been taken, others no less indispensable ought to follow. They should determine for the herds of cattle intended for exportation, the ways and channels they must travel by to go to any central part or to any railway station; and there the inspectors on duty should mark every animal that passes out of the district he is leaving. Heavy penalties should be inflicted on all who might infringe these rules.

These precautions would contribute in part to arrest the propagation of the complaint; but there is another measure more radical and effectual, which should be taken in order to prevent its extension—we mean inoculation, which has met with complete success in some of the governments of Russia.

Thus we see, there are powerful means of withstanding the production of the disease in its focus, or generative bed, and likewise its extension among the herds of neighbouring countries; and these latter might render them in some sort obligatory, by refusing most rigidly to admit to their markets, as in Italy has sometimes been done, every head of cattle which was not marked as inoculated or which was not furnished with a permit of health.

It is easy to conceive that those countries wherein the ox-typhus has its birth, and for which the breeding of cattle and their exportation are a great source of wealth, would soon feel that they are more interested than any other in stifling the contagion in its focus, and in affording to those countries that receive their herds, every security and guarantee which they have a right to expect. Interest in this case coming to the help of common sense, very satisfactory results would in course of time be obtained.

Moreover, we are conscious that we are here dealing with very complicated questions; for, though in a book they may seem simple and easy, their application is a matter of extreme

difficulty. We know too well that these preventive measures for protecting animals will meet with many obstacles, and only be adopted at last with tardy reluctance, since man himself continues in some respect indifferent to the causes which spread about the fearful epidemics to which he falls a victim in consequence of his neglect.

In truth, it is well known that the cholera of the present day—that much more serious *plague*—had its origin on the banks of the Red Sea, amidst the infectious miasmata developed near Mecca, where thousands of pilgrims who had died of fatigue and privation, and hundreds of thousands of sheep butchered and religiously offered up in sacrifice, have, beneath a torrid heat, generated the choleraic miasma, which formerly was supposed to be produced exclusively on the banks of the Ganges. This fact duly ascertained and proved, we might suppose that the governments of the different nations among which the cholera is about to extend its ravages, were indignant and had complained at thus being smitten with a scourge, due to the careless ignorance and sordid avidity of

some official of the Turkish Government. But we should be mistaken.

No! every one hoped at first that he, at least, would be spared by the contagion, and the authorities did nothing to resist the evil but adopt the old course of *quarantine*—a remedy more illusory now than ever, since the nations are in constant communication, either in their own persons or by the exchange of their commodities; and consequently, the epidemic is pursuing its invading course from week to week.

That which is being done for the cholera gives us a scale by which we may estimate the efforts which will be made to arrest the generation and the contagion of the cattle typhus.*

We are certainly bound to resist the introduction of horned cattle tainted with typhus; but in the conditions amidst which they live, some of them may bear the seeds of the dis-

* Since these lines were put into the printer's hands, the French Government have proposed to other nations to take measures collectively to prevent the pilgrimage to Mecca continuing to be a cause of the spread of cholera. We hasten to render justice to this prudent initiative. But why not take the same measures against typhus which are judged necessary against cholera?

temper, even whilst they appear in perfect health, and therefore able to endure the fatigue of a long journey.

Now, in order to avoid exciting the incubation of the typhus during their transit either to Finland, Holland, France, or England, it must never be forgotten that these animals are gifted with a nervous sensibility of wonderful acuteness, joined to the weakest vital resistance. Care must be taken to husband their strength, to give them a choice distribution of food easy of assimilation; barley-meal, or other grains, must be mixed up with their drink; they must be protected from the changes of weather; they must have room enough and air enough in the locomotive stalls on the railway trains and on board ship.

We pass over in silence the hygienic measures to be taken in order to keep these vehicles of transit in a proper sanitary state: the sanitary police regulations inserted further on will make them sufficiently known.

All these measures having been taken to meet and withstand distant causes and dangers, let us now direct our attention to those local causes which strike our eyes, and which

likewise have their share of influence in propagating the disease. Thus, whenever an inclement season comes to deprive the herbivorous animals of sufficient pasture, or to deteriorate its natural qualities, we are bound to remedy this change, and to increase the cares we devote to them ; for these frail and helpless creatures, immediately feel and suffer from the effects of a sustenance less than usually restorative. Under such circumstances, we must make exceptional sacrifices ; when they return from feeding on the grass, we should give them some additional fodder, or roots of a generous quality. We must imitate the regimen used in the country of the steppes, by adding to their forage a solution of marine salt, or a solution of sulphate of iron. Day by day we must give to the weakest and least fed cattle, a ration consisting of bruised oats, pounded juniper berries, gentian, sulphate of iron, and carbonate of soda.

For, if we neglect to take those measures which are required to prevent among herbivorous animals the development of those ordinary epizootias, which every year are generated on our own soil, they will certainly afford a

favourable seat to the typhic miasma transmitted by foreign animals, or exceptionally generated by themselves. These cares and attentions must be greatly increased, when the foreign epizootia has spread itself, as in the present instance, among our flocks and herds. Then, indeed, we must be careful not to load these creatures with pampering food for the purpose of fattening them. For it may be profitable, and the breeder may plume himself, on having produced an adipose monstrosity to such a degree as to bury, for instance, a pig's head in the fleshy exuberance of his thorax; but such a derogation from the laws of nature borders closely on disease, and assuredly such an unnatural accumulation, predisposes the glutted animals to epizootic diseases in general.

The water given them to drink must be attended to with particular solicitude. It should never be drawn up from ponds or stagnant rivers. The animals kept in the pasture grounds should always find at their disposal, in receptacles intended for their use, a supply of pure fresh water.

After these precautions with respect to their food and sustenance, attention must next be

directed to the hygienic conditions required by the animal. Every morning he should be cleaned, washed, brushed, and dried ; what is every day done for the horse must now be done for the ox. These unusual cares will be most salutary to him, and greatly increase his vital resistance.

The animal thus protected in his food and particular necessities, attention must next be directed to the stalls and sheds. Over-crowding must be carefully avoided ; the proper cube of air for breathing must be measured out for each head of cattle ; every day the latter must be carried out into the open air ; the floor of the stall or shed must first be thoroughly cleansed and washed out, after which it must be sprinkled with a solution of chloride of lime. If the stall is not well aired, a little straw should be burned on the ground, to improve the atmosphere, or else branches of resinous trees, or juniper berries may be used. In some cases aromatic fumigations of sage, rosemary, or mint, boiled in water, are employed, the balsamic vapours which arise therefrom being at once tonic and purifying. During the night a tub, containing pitch and

tar, should be left in the stall, or a large piece of camphor should be suspended from the ceiling. Vinegar may be spilt on a piece of red-hot iron, or powder of sulphur may be burned into sulphuric gas and diffuse its vapours through the stall or shed. This excellent parasiticide may perhaps be equally endowed with anti-typhic properties.

Finally, when this fatal epizootia is ravaging the country, every farmer and agriculturist must carefully abstain from mixing with his herds any cattle which have been bought either at fairs or markets; he must take care, conformably with the directions issued by the Privy Council, (to which we refer the reader for more ample details,) to avoid all contact both direct and indirect with horned cattle tainted with the typhus, as he might himself become an instrument of the contagion.—Let him never forget that to take as the guide for his actions in these times of calamity his private and personal interest, is the greatest crime a man can commit. Let him strive, therefore, to assist the authorities in the measures which they have taken for the interest of all.

II.

Now that we have examined the measures which prudence directs us to take to defend ourselves against the causes which produce and propagate typhus, let us think of the means of preventing it, when the contagion threatens to diffuse itself over a whole kingdom, as at present it is doing in England.

When, on the 19th of last June, it was believed that the typhus or Cattle Plague, as they continue to call it, had effected its invasion in England, the Government, informed by professional men of the serious danger to which the interests of the country would be exposed, if the disease should spread, might have considered this distemper not as a question of private interest, but as one of public and national concern. It might at the outset have given to this epizootia all the significancy of a public calamity, have looked upon it as the invasion of an enemy threatening to destroy its territory, and have employed every possible means to stifle it at its birth.

We well know that the English Government, derived as it is rather from political

than from religious and social changes, is at once monarchical, aristocratic, and partially democratic, and for that reason embarrassed in its working by so many wheels. Its authority is scattered and divided, whilst the respect ascribed to the prerogatives of each distinct public power is the safeguard of the State. In the absence of both Houses during the recess, it could take no resolution as to ways and means; for the difficulties on this unhappy occasion, we cannot too often repeat it, are reduced to a question of money. Deprived of the requisite authority, it was unable to do more than exhume the old laws on the matter and ordain new ones. And yet, the impotence of the Government was not perhaps so great as is imagined; for whilst it suffered the typhus almost unmolested to devastate the country, it very justly, and in the name of the public interest, took vigorous and effectual measures to stamp out another epidemic—the rash and insane conspiracy of the Fenians. It stood still and would not authorize domiciliary visits in stables and stalls, nor the seizure of sick animals, but it did not falter a moment at the domiciliary visits and incarceration of insurgent citizens

meditating mischief, so that in this instance, the privilege of immunity has been given to the brute creation. Everybody, both in England and out of England, admires their vigour and despatch in stifling the insurrection in its bud. But why not act with equal promptitude in the case of an epizootia?

Arming itself, in this manner, in the public interest, and with sufficient power, the Government might have appointed an executive commission, with the Lord Mayor as president. Such a commission would have applied itself at once to the consideration and studious examination of the subject in all its bearings, and would have proposed prompt and energetic measures, which the Government, with equal despatch, would have confirmed by giving to them the authority of law, as they have since tardily done. A fund, which, for the wealth of England, would not have been considerable, 250,000*l.*—the cost of a few Armstrong guns—might have been placed at the disposal of this Board, to enable its directors to meet and provide for, without delay, every just claim and want arising from the scourge.

An auxiliary commission, exclusively medical,

and consisting of medical and veterinary doctors, might have been formed conjointly with the former, and every preventive measure, considered by them as necessary to stamp out the complaint at the outbreak, after it had been proposed by the medical board, and submitted to the executive commission, and by them to the Home Secretary, might have been acted upon by law within twenty-four hours.

Taken unawares, and the mode of treating the sick animals not being known at first, they would have been reduced to the cruel necessity of exterminating at once all tainted cattle, as well as those belonging to tainted herds, but not without compensating the owners of those cattle.*

They would have sent two physicians to Russia and Hungary, to observe and study the preventive and curative medication, especially their mode of inoculation, and thanks to the rapid locomotion of these times, twenty days would have been sufficient for this foreign

* The typhus which broke out fifteen days ago near Roubaix, in France, bordering upon Belgium, where the epizootia rages, appears to have been stifled in its focus by the instantaneous extermination of the whole herd in which it declared itself.

exploration. The physicians constituting the medical board should have been authorized to seize any beast tainted with the typhus; a company should have been charged to collect and keep ready for the public service, at the four quarters of London, an ample retinue of horses, closed carriages, and working men, to convey at all hours of the day and night the carcasses of the slaughtered animals to the respective spots, where long and deep trenches had been dug to receive them. Each carcase before burial to have been well sprinkled with chloride of lime.

By taking this course, every one's interest would have been respected, as much as can be desired when a great calamity threatens a country; besides, in doing so, the present ministers would but have followed the example of the Government (with regard to compensation), during the epizootia of the eighteenth century. The proprietors who had thus received, not the full and absolute price, but a sum sufficiently remunerative for their sacrificed cattle, would have assisted the authorities, and thereby would have served the common interest, because their sick cattle,

perishing every hour within their stalls and sheds, were no longer a real source of embarrassment and ruin. They would not have been obliged to drive them to market to get what they could out of them and disencumber themselves. The most active cause of the contagion would by this means have been prevented.

This allowance having been made for the most pressing dangers, attention should next have been directed to a matter no less important—we mean the treatment and cure of this distemper; for we will never admit that England can have fallen back a century, and that whilst those enlightened men—Malcolm Flemming and Layard—proposed and tried to cure and prevent ox-typhus in 1757, we, in 1865, shall have been reduced to the horrible alternative, the repugnant barbarity, of the general and indiscriminate extermination of the tainted cattle.

Whilst, therefore, the treatment of the typhus would have been studied on the spot, and the most urgent measures would have been taken to withstand the propagation of the evil, they would have established, a few

miles from London and on the northern side, in the direction of the great cattle market, a number of hospitals or sanitariums, and, as far as possible, within a park. These hospitals, constructed of wood, containing, besides stables and sheds, a slaughter-house, a dwelling-house for the staff of employés, a laboratory stocked with all the physical and chemical instruments required, &c., would in two or three weeks have been sufficiently prepared to receive a certain number of cattle.

Provided with these advantages and opportunities, a permanent stage of operation would have been raised on which trials and experiments might have been made with every chance of fruitful results. In these sanitariums, for instance, the most practical physicians and veterinarians might have entered upon a systematic course of treatment, dividing the bovine patients into classes, according to their periods of disease, their age, &c.; and trying some particular mode of treatment, some remedy considered as effectual, alternately, upon each of these classes of tainted cattle. These experiments, having been made under circumstances so favourable, would have

enabled the faculty to establish a medical basis, which, if not infallible, would have been relatively efficacious, and might have saved a large number of the infected animals.

Whilst thus fixing their attention on the cure of the sick animals, these experimentalists would have carefully studied and practised the preventive treatment by inoculation, availing themselves both of Layard's hints and recommendations and of the practical knowledge acquired by the medical expedition to the steppes, which would by that time have returned from their mission. They would have selected animals smitten with the genuine typhus, of the typhoid and intestinal form, in *the third period*, whilst the depurative and critical secretions are running from the mucous membranes; they would have gathered the virus from its springs of infection or from its purulent subcutaneous deposits or from the serum of the blood.

On the other hand, they might have chosen four heifers, of good constitutions and healthy, and these they might have prepared, according to Layard's advice, for inoculation, by a special treatment, and by hygienic and medical cares.

On some of these the inoculation would have been made near the tail, according to the subcutaneous process, with a lancet charged with typhic virus; on others, a crucial incision, or cross-cut, would have been made on the crupper. But, to speak truth, we cannot do better than Layard, whose ingenious treatment, with all due deference to a certain veterinarian of our day, deserves a very different epithet than that of being amusing.*

Layard says:—

“That nothing may be omitted which in any shape can contribute to the success of inoculation, due attention should be paid to the constitution and state of the beast,

* “It is amusing to read authors of the last century on the treatment of this disease. They were far more confident in their powers than we helpless creatures pretend to be. The directions given are full and distinct, and in chapters boldly headed ‘The Cure.’ The beast is to be bled, washed, and hot vinegar and water, with aromatic herbs, may be placed in the stable to revive the cattle. The animal must be rubbed a quarter of an hour, both morning and evening, and the bags of a milch cow should be anointed morning and evening with warm oil. A rowel is to be made in the dewlap by taking a skein of hemp, tow, or twisted packthread, a foot long, and as thick as a man’s thumb. *The prescriptions are most amusing.* They may serve to entertain those who want the cure at present, and for this reason I reproduce one or two.”—*Gamgee, Letter on 21st August.*

no less in this practice on the cattle than on the human species. Undoubtedly the young, healthy, and strong bid fairer for a good issue than the old, sickly, and feeble; each of these different constitutions demand a particular treatment, even in the method of preparation; and however trifling it may seem to many—the urging a necessity of preparation—I will venture to affirm that I have seen excellent effects arising from a rational preparation, and fatal events from want of preparation. I have likewise been witness of unfavourable turns, merely from an injudicious preparation.

“The beasts which are sanguine require moderate bleeding; those that have but a small share of blood must have none drawn. The strong must, besides moderate bleeding and purging, be kept on light diet and their body kept open. Thus, scalded bran, mixed with their hay and chaff, will cool them. The weakly, and such as are inclined to scour, must be kept on dry fodder, and have peas and beans given them to strengthen them. A mess of malt, or a quart of warm ale, with a few spices, will be very suitable for them.

“Whatever diseases the cattle be affected with, if time will permit, they are first to be removed.

“The cattle to be inoculated are first to be well washed, rubbed dry, and then curried, to remove all the filth from the hair and skin. Then they are to be placed in a spacious barn or stable, where the air is temperate and no cold can come to them. There they are to be prepared according to the direction already given, foddered with good sweet hay, and watered with clear spring water; and if the distemper be not near they may be turned out into the air, near the barn or stable, and may stay there a few hours in the middle of the day.

“When it appears that the cattle are in perfect health, free from any infection or other disease, brisk and

lively, neither costive nor scouring, and chewing their cud, then the operation may be safely undertaken, and henceforth they must be confined to the barn.

“ Since there is observed to follow the greatest flow of the contagious and putrid particles separated from the blood, wherever the infectious matter makes an impression at first, particular care must be taken not to inoculate near such vital parts as the heart and lungs, nor near the womb, if a cow with calf be inoculated ; for, though rowels are properly applied in the dewlaps, to draw off the pestilential humour from the breast, and in other cases beasts are frequently rowelled in the flanks,—yet in this operation, as matter is inserted by these channels into the neighbouring vessels, those vital parts, or the womb, might become the chief seat of the disease, and the event prove fatal.

“ To prevent such accidents, human beings have been inoculated on the arms and legs, and now-a-days the arms are found sufficient. I would recommend that the cattle should be inoculated about the middle of the shoulders or buttocks, on both sides, to have the benefit of two drains. The skin is to be cut lengthways two inches, deep enough for the blood to start, but not to bleed much. In this incision is to be put a dossil or pledget of tow, dipped in the matter of a boil full ripe, opened in the back of a young calf recovering from the distemper. It may not be amiss to stitch up the wound, to keep the tow in, and let it remain forty-eight hours. Then the stitches are to be cut, the tow taken out, and the wound dressed with yellow basilicon ointment, or one made with turpentine and yolk of egg, spread on pledgets of tow. These dressings are to be continued during the whole illness, and till after the recovery of the beast, to promote the discharge ; and then the wound may be healed with the cerate of lapis calaminaris, or any other.

"On the third day after inoculation, the discolouring of the wound, whose lips appear grey and swollen, will be a sign that the inoculation has succeeded ; but the beasts, as Professor Swenke informs us, did not fall ill till the sixth day, which answers exactly to the observations daily made in the inoculating of children. Yet the Professor adds that on the third day a costiveness came on, which was removed by giving each calf three ounces of Epsom salts.

"No sooner do the symptoms of heaviness and stupidity appear than the beasts must have a light covering thrown over them, and at night fastened loosely. They must be rubbed morning and evening, and curried, till the boils begin to rise ; warm hay-water and vinegar-whey must be given plentifully. Should the beasts require more nourishment, dry meat, such as hay, with a little bran, may be offered. I should be very cautious in giving milk-pottage, even after the boils and pimples had all come out, for fear of bringing on a scouring. However, this caution is proper, that whenever milk-pottage be given the vinegar-whey is to be omitted for obvious reasons. In cases of accident, the same attention is to be observed in the disease by inoculation as in the natural way, and the medicines recommended are the same I would use ; but by inoculation there seldom is a call for any, so favourably does the distemper proceed through its several stages.

"The crisis being over, it will be proper to purge the cattle, to air them by degrees, and to have the same regard in the management of them as is laid down in the chapter on the method of cure."

The typhic virus is so highly infectious and poisonous that the first animals inoculated

would have all died; it would have been necessary to inoculate successively a number of animals with the virus derived from the first inoculation, and transmitted from an inoculated animal to a healthy one, by which means they would have acquired a virus of the first, second, third generation, and so on. These inoculations having always been made on four animals at a time; on two of them, the disease would have been left to take its own course, in order that the experimentalists might watch its progress and development, and the two others would have supplied the virus for inoculation.

At the third or fourth generation, the virus, modified and attenuated in its infectious principles, would no longer have been mortal in its effects, as experience has proved in Russia. Then the inoculated animals, placed under the control of hygienic cares and a few purgative and tonic medications, would have passed from convalescence to health. The virus thus attenuated would have supplied the means of a practical inoculation on a large scale to all healthy animals.

Proceeding thus, they would, moreover, but

have followed the method adopted in those times of epidemic and epizootia when the small-pox is raging. On those occasions, we subject our sick patients to vaccination or revaccination; we inoculate the variola in our sheep threatened with the contagion; we pursue the same course in cases of epizootia, of peripneumonia. And truly, that which it is reasonable to do in one case may be generalized and applied to a greater number.

The experiment we have suggested might, perhaps, have been long and difficult, nay, even costly, but we should have established, after a certain time, the rational method of this preventive treatment, and have distributed the same throughout the country. Veterinarians would have formed in particular districts their centre of operation, in which the preventive virus might have been produced, and they might have gone from farm-house to farm-house to inoculate all the cattle within them.

From these facts and observations made by the physicians, precious documents would have been derived; and if, contrary to all expectation, success had not justified every hope, we should have bequeathed to future generations

facts and experiences which would have been of the most useful character to them and full of instruction. Thus it is that science advances and progress is accomplished.

If all that we have just indicated as a realizable matter had been done, in effect, England would have afforded in this, as she has so often done in other cases, a noble example to be followed, and would have acquired a new title to the admiration of other nations.

But, unfortunately it has not been so: silence has succeeded to eloquence at Guildhall, and the meetings at the Mansion-house have flickered away. That which was held on the 27th of September, seems likely to be the last of them.*

* Dr. Letheby reported that 12,916 lbs., or more than five tons of meat, had been condemned in the City markets during the past week as unfit for human food. It consisted of 64 sheep, 4 calves, 7 pigs, 142 quarters of beef, and 361 joints and pieces of meat; 5377 lbs. were diseased or from animals that had died of disease, and the rest was putrid. All of it was destroyed. Yesterday, a sub-committee of the Metropolitan Plague Committee, at a meeting at the Mansion House, passed an unanimous resolution, on the motion of Mr. Brewster, recommending that, as unexpected and insuperable diffi-

The subscriptions which, in spite of all the praiseworthy efforts and earnestness of the Lord Mayor, did not reach 2000*l.*, were returned to the subscribers, so that all the attempts which have been made to centralize the direction to be given to the various measures have proved abortive. The plan of forming sanitariums, as well as that of compensating the owners of cattle, have both fallen to the ground.

What can we think of such a state of things when we see the ox-typhus extending its ravages to sheep, and have to fear that the disease will spread to other animal species? What serious reflections it creates in our minds, and what awful consequences we might deduce therefrom! But what would be the use of them?

Let us add, however, that France, save on the recognised principle of indemnification, and a more speedy extermination of her tainted cattle, has shown the same deficiency as to

culties had arisen in carrying out the purposes for which they were appointed, the money already subscribed should be returned to the subscribers, after deducting, *pro rata*, the expenses already incurred.

the means of treatment as England ; whilst we have the consolation of attributing this impotence on the part of this country to the fact that the outbreak of the epizootia has occurred during the Parliamentary recess.

It is, therefore, to institutions rather than to individuals that we must ascribe the impossibility of conquering the difficulties which have been met, and which at any other time might not have obstructed the course of things. Far be it from us therefore to accuse of indifference a great people renowned for their zealous promotion of public interests, for their charity and inexhaustible philanthropy, whose innumerable asylums have been opened to every misfortune, who support so many hospitals and public charities by their voluntary contributions, and who, in so many calamities, have seen some devoted heroine issue from her retirement to assuage them. For if the Crimean war produced its lady beneficent in the person of Florence Nightingale, all of us must allow that if others had followed the example of Miss Burdett Coutts, who, in a manner, has stood alone against the storm, by the facilities she has afforded for treating and experimentalizing on the cattle

smitten with typhus, the formidable scourge might have been arrested in its focus.

III.

Curative Medication.

We might acquire the means of resisting the general causes which develop the typhus; we might stop its diffusion, we might even prevent it, by inoculating the sound and healthy animals, and yet it would be necessary, none the less, to search for the means of curing it; for, as in the small-pox, the preventive treatment of which we know, certain circumstances would arise in the disease which would oblige us to treat it. And as we are far from being able to resist the generation and dissemination of this scourge, which reckons almost as many victims as sufferers, it is important to make known what treatment we can oppose to the functional derangements to which it gives rise.

As we have already said, this typhus, when the organism has absorbed its peccant and infectious miasma, produces a succession of disorders which become in a manner tempo-

rary functions; it pursues its phases, its periods; and as the functional derangements differ at these several epochs from the development of the morbid phenomena, the course of medicine which is employed to check them cannot always be the same. Starting, therefore, from practical data, we will attend the disease in its gradual advance—that is to say, in its distinct periods—and will afterwards explain certain predominant symptoms, which, owing to their importance, must likewise fix the attention of the careful therapist.

It will be remembered that we have recognised four periods in the regular course of typhus:—

- 1st, a period of incubation;
- 2nd, a period of initiation;
- 3rd, a period of duration;
- 4th, a period of decline.

But, in the first place, before beginning the treatment, every farmer or grazier, or cattle-owner, who keeps a certain number of cattle, should divide his herd into several classes, in order to regulate and methodize the cares to be given to the sick.

Thus, he will form a first class, comprising

the animals in a sound and healthy state, having had no intercourse, either direct or indirect, with the tainted cattle, and which he will be careful immediately to isolate and keep apart.

A second class must be formed of those beasts, which, though as yet unaffected with the distemper, have, nevertheless, been exposed more or less directly to its contagion, by living and consorting with them, or by their contact with other animals, either at fairs or markets, or in the ships and cattle-trucks on the railway during their transit from one place to another. The horned cattle composing this latter class must be carefully watched, and be made the subject of the preventive treatment, the moment the first sign appears of the working of the incubation.

A third class must be formed, consisting of cattle actually smitten with the distemper.

These divisions of animals being thus settled and separated, will diminish the labour and the cost of treatment and the liability to diffuse the complaint, especially when the epizootia begins to lose its virulence.

First Period—of Incubation.

We have said that infectious diseases, when once the frame had suffered the effects of the poisonous miasma, pursued their fatal course, and that, generally speaking, it was impossible after such infection to arrest its development. We say generally, for the typhus at the outbreak of its appearance on a virgin soil sometimes manifests itself in a benignant manner, then it becomes more destructive, by-and-bye its pernicious properties decline, and it in some sort goes out of itself. One would say that the epizootia, like those it smites, has likewise its peculiarities, its period of initiation, of duration, and of decline. There are in consequence fixed times or epochs during which the sufferers afford better scope for our means of action; at a given moment the attenuated virus, having lost much of its deadly effects, ceases to produce death, which decline is the real source of the marvellous successes obtained by certain remedies against the epizootia.

If it be true that the distemper at its period of duration, and at its most critical moment,

cannot be fettered, we should not be justified in asserting positively the same, as respects the period of incubation. Indeed, we are convinced ourselves, that if ever this disease shall be clogged in the wheel, *if ever its specific remedy shall be discovered, it will be within the period of incubation*, when the economy begins to struggle with the first phenomena of the poisoning. Be that as it may, we cannot, in epizootic times, too earnestly enjoin the owners of cattle to submit their animals to a strict and close inspection, in order that, when the first signs of incubation appear, they may modify the animal's usual diet, and attack the disease at its birth, so as to render it abortive, if the thing can be done.

At this period we must endeavour to come to Nature's assistance, we must shake and stir up the economy, we must unseat the morbid functions which seek to master us, and then the vital force, thus solicited and stimulated, may sometimes struggle with advantage. To do this effectually, if the animal is atonic and predisposed to adynamia, if his internal organs are relaxed, we will strengthen him by administering every day a stimulating

beverage. If he is confined to the stall we will give him the open air, and let him graze the fields; which is a treatment by itself for the invalid animal, so vivifying is the pure air of the common, and so thoroughly different from the atmosphere which is pent up within his stall. If the animal is strong, lusty, exuberant with health, let him be purged once or twice, the purgative to be given at intervals of twenty-four hours. (We shall give the medical formula in the chapter addressed to farmers, graziers, &c.)

This purgation, moreover, will correspond with the theory of those authors who consider the evacuations as the proper means of delivering the economy from the infectious miasms which have been absorbed.

If the beast is plethoric, recourse should sometimes be had to bleeding, especially in hot and dry seasons, like the one we have recently passed through.

These stimulative and depletive medications cannot but be favourable to the animal, since it will anticipate the treatment to which he must be submitted a few days later, when the disease shall have declared itself.

To this treatment, in some sort preventive, must be annexed an *antimiasmatic* beverage, either a *permanganate of potash*, or a solution of *chlorate of potash*, or of *arsenic acid* in powder, mixed with some aromatized beverage, or solution of *arsenate of soda*. These antityphic drinks must be discontinued on those days when the sick cattle are purged.

It need hardly be said, that during this period of incubation the feeding of the cattle must be strictly attended to, and that the animal must receive unusual hygienic care.

Second Period, or that of Initiation.

At this period the constitution and temperament of the sick cattle must first of all be deliberately studied, so as to ascertain fully which are *lymphatic*, which are *nervous*, and which are *sanguine*. We must notice the age, the sex, the state of gestation, and make allowance for any prior complaints to which any of the sick cattle may have been subject. For if, like certain system-mongers, we reduced the treatment of all tainted cattle to the same mathematical formula of medication, that is, either to bleeding or to purging exclusively,

we should certainly increase the number of victims.

In this stage of the disease we have to contend with the derangements of the circulation and secretions. The fever is generally intense, the blood is inflamed or vitiated, the mucous membranes are dried up; shiverings, alternations of cold and heat, &c., occur. We must then mitigate these morbid phenomena either by bleeding or purging. The bleeding must be more or less copious, according to the strength of the animal. For, it must not be forgotten that we have several critical phases to pass through, and if we exhaust the animal by too largely draining him of blood, we may forfeit the success of the treatment. If bleeding is considered unnecessary, let the sufferer be purged at once, by administering either *sulphate of magnesia* (*Epsom salts*), or *sulphate of soda* (*Glauber's salt*). These purges to be taken daily, for two or three days, according to the way they operate. Linseed oil, mixed in some warm beverage, may be given instead of these, or else a mixture of rhubarb and calomel, or even a decoction of senna. Preference should be given to saline

or laxative purges, as, drastic purgatives, such as aloes or jalap, sometimes concentrate the inflammation on the narrow parts of the digestive channels.

In this second stage—the period of initiation—the appetite is generally gone, the thirst excessive; so that nutritive or solid feeding must of course be suppressed.

As for the drinks, they must be cold, consisting of water with sufficient flour mixed in it to whiten it, and a little vinegar or sulphuric acid, to acidulate it. A decoction of good hay with some marine salt, or nitrate of potash; a decoction of pellitory or wall-wort, of ground-ivy, or whey, or buttermilk, likewise acidulated, and which the cattle are very partial to, will in every way be suitable for their use. If the heat of the skin diminishes, and if congestion appears to settle on the lungs, the drinks must be given warm, consisting of a decoction of borage leaves, mallows, marsh-mallow, and pellitory. In these cases, the body must be protected from chills by overlaying it with blankets, so as to keep the mass of the blood as much as possible on the surface, and check the tendency it has to load the internal organs.

By following these prescriptions, we shall answer all the conditions of the treatment during the second period. In truth, by the process of bleeding, we shall have reduced the heat of the fever, and prevented too great a flow towards the nervous, pulmonary, or digestive centres. The purgings will have acted with similar effects ; and, what is more, they will have cleared the *primæ viæ*, and rendered the circulation of the abdominal apparatus more easy. In fine, the drinks will have contributed to assuage the violence of the fever. The washing, which must be effected with a wet sponge passed over the nose, mouth, and eyes, and then over the skin, which must afterwards be rubbed dry, will be both useful and pleasant to the sick animal. This cleansing will maintain the important functions of the skin in due order.

Some persons have advocated as most efficacious at this period hydro-therapia, or the Water-cure, in the form of warm and cold ablutions, vapour baths, &c. This treatment, so bracing by its revulsive action, and the powerful influence of which we witnessed for several years in the establishment which we

superintended at Belle Vue, near Paris, might prove of some service in ox-typhus, especially in the form of the vapour bath; but it requires so much practice, and so incessant and watchful a care, that it is needful to have the process attended by an experienced practitioner.

We must remark, in addition, that the general state of the animal, and his desire for food, will show the degree of strictness and restraint which must be observed in regulating his diet. His instinct must be taken by us as a guide; and if the drinks rendered nutritive by the addition of bran, oatmeal, barley flour, or even seed of grass pounded, are relished by him, we must indulge his desires to some extent, in order to keep up his strength.

Third Period, or that of Duration.

At this stage of the distemper we must watch and follow step by step the symptoms which attend it, and come to their relief.

All the secretions have now resumed their course; from the mucous membranes there occurs a copious discharge, first of all serous, then thick and muco-purulent; the breathing

may be obstructed, the diarrhœa frequent; the air infiltrates beneath the integument. The fever is sometimes continuous, sometimes intermittent. We must satisfy the cravings of the vital powers by administering the same beverages as in the preceding period. Far from checking the diarrhœa, as some advise, we must regulate the evacuations by means of laxatives, such as tartrate of potash, sulphate of magnesia, or sulphate of soda. It is very essential, indeed, that the mucous membranes of the digestive channels should be free, and not irritated by the contact of solid alimentary substances or bilious secretions.

If the diarrhœa be too frequent or irritating, we must give the sufferer night and morning a clyster, consisting of bran water.

At this period we will follow the advice given over and over again by all the physicians of the last century, and apply cauteries with red-hot iron, or fix one or two setons either on the dewlap, the neck, or the thighs, and these issues must be kept open by means of basilicon ointment. It is unquestionably of the highest importance to promote all the depurative secretions in animals whose cellular

tissue is choked up with grease and lymph. Those only have got well in which the running has been regular and copious, and the wasting of the flesh progressive.

If the fever is not regular, two pills of sulphate of quinine must be given, each pill containing one gramme, one pill in the morning, the other during the day, in order to prevent the fit, which usually takes place in the evening. If the state of atony, of adynamia, comes on at this period, *acetate of ammonia* must be given, from one to six ounces, in a pint of water, the same to be administered in two doses; only the acidulous or alkaline drinks must be discontinued, otherwise the acetate of ammonia would be decomposed in its passage into the digestive channels. Finally, the eyes, the nostrils, and the mouth must be frequently washed with an infusion of camomile, or some other aromatic plant.

The setons must be kept up very carefully. If the sick animal relishes the nutritive beverages, let him have a decoction of bread, rice, barley, or oats.

Fourth Period, or that of Decline.

At this stage of the disease, in which adynamia predominates, everything must tend to support the organism. The drinks must be bitter and stimulating; beer, with plenty of hops in it, with an addition of powdered Peruvian bark or sulphate of iron, may be given; or a decoction of this bark, with gentian roots, centaury leaves, and hops; or again, a beverage may be administered night and morning, made of veterinary theriacum, of extract of juniper and alcohol; or finally, an infusion of aromatic plants.

If the diarrhœa be bloody and fetid, give the animal night and morning a clyster, consisting of a decoction of Jesuit's bark, adding thereto a spoonful of powdered wood charcoal, pounded to the finest powder, and passed carefully through a sieve. If the running ceases, its return must be excited by injecting in the nostrils a spoonful of sternutatory vinegar or smelling salts. Finally, the purulent boils must be opened, and dressed with stimulating ointment.

At this closing period, which determines the fate of the disease, as we say, there is a tendency to despair of the cure. Seeing the fatal course of most attacks, we lose heart, death seems inevitable, and we yield its prey to its fangs. But let us not despair; let us remember that, in these febrile infectious diseases, above all, the phenomena must almost always proceed to the last stage of exhaustion of the vital powers to render the cure attainable. Some patients, smitten with typhoid fever or cholera, have owed their lives to the indefatigable tenacity of the contest *in extremis* between life and death.

I still see before me a choleraic patient, whom, during the epidemic of 1849, I had left in the morning at ten o'clock, passing into the cold period. At five o'clock I returned to see him; the whole family was in tears, and the sheet had been thrown over the patient's head, as if he had already breathed his last. Time was precious to me at that fell season, and I was about to retire, when I applied my finger to the wrist of the sufferer, and felt a faint pulsation at long intervals. I threw

my coat off directly, called for flannel and essential oil of mustard, which I had prescribed that morning. I set the example, and instantly the whole family helped me to rub the patient in every direction. In a quarter of an hour the heart quickened and revived, and in less than half an hour more the circulation resumed its course; at the end of an hour of this obstinate struggle the vital heat began to show itself—in a word, the patient was saved.

We must not, therefore, give up the contest until the death of the sufferer is fully ascertained; and the same persistency should be practised in the case of animals smitten with the typhus. If the circulation slackens, if the skin turns cold, take a piece of wool, coat it with rubefacient liniment, and rub the animal therewith, more particularly along the spine. Then give him a cordial drink, and pass *raies de feu* over the loins. All these appliances will help to stimulate the nervous system, and resuscitate the exhausted powers of life.

If, at last, we are so fortunate as to overcome the profound adynamia which has

utterly prostrated the frame, we next shall have to sustain the sick animal by giving him decoctions of meat with sea-salt, or sulphate of iron added to it, or a light broth, made with meat and bread.

Herbivorous animals, put upon a carnivorous diet, would not generally endure it, of course ; but some of them rather incline to unctuous beverages, and even to cooked or raw meat. All men know that certain horse trainers give race-horses a small portion of meat, especially when the races are coming on, in order to increase their mettle and strength.

We remember a sheep, which we saw at the Ecole d'Alfort, during our studies of comparative pathology and the cutaneous diseases of domestic animals, which manifested a great liking for meat, and even eat it ravenously like a glutton.

In convalescence, the animal must be sent into the open air, in some fold enclosed with bars ; he must be taken every day to pasture, each day increasing the time he is allowed to feed, and gradually he will be left to return to his usual regimen. But still it

must be observed, that in this distemper convalescence is long and slow, and very deceitful. A too substantial course of feeding often revives the inflammation of the intestines by irritating ulcerations not yet healed, and more than one animal which had been looked upon as cured has perished in its convalescence through a lack of watchful attention.

Herbivorous beasts, therefore, incline to and digest animal food; consequently, we must give sick-oxen meat broths, pure milk, or milk and water. With these must be mixed wheat straw chopped small, for hay or even oat straw would swell and distend the stomachs.

The typhus in this epizootia is not regular in its progress and development. Frequently the nervous or pulmonary phenomena predominate, when the treatment, such as we have just explained, must be modified. We must also bear in mind that nature does not divide a disease into periods, like those we have adopted to render our exposition of the symptoms more intelligible and the treatment itself more methodical.

If the nervous form of the disease prevails

—if the animal shows alternations of dulness and restlessness—if, pressure on the spine is very painful—above all, if, in bulls, for instance, there is plethora, let the bleedings and purgings be increased in order to abate the nervous erethismus. In this form, the violence of the attack usually carries off the beast. Should there, however, be any chance of saving him it will be by employing this medication, which is at once revulsive and depletive, notwithstanding the well-known fact that bleedings, far from relieving the nervous system, sometimes aggravate its irritability.

A general ablution with cold water may be tried in *desperate cases*. The animal must then be immediately well rubbed, and covered with wool, in order to excite a thorough reaction.

In the pulmonary form of the typhus, but only during the acute stage, the drinks must be warm and emollient, composed of a decoction of soothing substances, with mallows, &c.; or one of linseed, to which must be added some oxymel of squills and opium. The purgatives must be non-stimulating; and

emetics, freely diluted, for instance, will be very serviceable.

At the third and fourth period in this pulmonary form of the disease, adopt the treatment prescribed for intestinal typhus.

We might have greatly enlarged the list of the pharmaceutic agents, but the richer a treatment is in remedies the poorer it is in cures. We have made choice of the simplest and safest among all the remedies advised by experienced men, making allowance for the difficulties inherent to the number of animals, the mode of application, the cost, &c., always keeping in view the life of the animal to be saved and the interest of the cattle owners.

We think that the treatment by inoculation might have prevented the typhus in a very large proportion, and that the curative medication might have saved many of the infected cattle at the worst period of the epizootia.

Such, then, are the results which will one day be obtained, when we shall be able to supersede the barbarous process of general extermination, by the adoption of a rational treatment, founded at once on science and practical experience.

IV.

Hygienic Measures to be taken against the Extension of the Contagion—Acts and Orders concerning Sanitary Police Regulations.

I HAVE purposely neglected, in discussing the various plans of treatment, certain measures to be adopted with the object of opposing the spread of the contagion. The memorandum published on this subject by the Privy Council, and drawn up by Dr. Thudichum, is so complete and so clear, that we can find nothing better to say. I recommend its perusal to all who possess horned cattle, and who have occasion to send them to any distance. It is of the highest importance to follow this judicious advice, as the general interest will constitute here the safeguard of the pecuniary interests of each in particular. I add to this memorandum upon hygienic measures, the consolidated and amended acts and orders published under the head of "Sanitary Police." In this way those interested will have beneath their eyes all which it is important for them to know, both in a medical and legal point of view.

MEMORANDUM on the Principles and Practice of Disinfection, as applicable to the present Epidemic of Cattle Disease. By J. L. W. THUDICHUM, M.D.

I.—PRINCIPLES OF DISINFECTION.

I.—Principles of disinfection.

1. Definition of disinfection.

1. The term disinfection signifies the removal and destruction, or destruction and subsequent removal of the products of destruction, of all matters actually being or containing products of disease capable of reproducing disease in other animals.

2. May include special purification and deodorization.

2. If the same processes and means, as used for this purpose, are applied to the purification and deodorization of places and things not actually infected, but capable or suspected of being infected, then these preventive measures are practically and properly included under the definition of disinfection.

3. Reproducers and primary carriers of infection.

3. The reproducers of the infectious matter or contagion are all kinds of cattle of the ox tribe, which also are at present in this country the only animals liable to its specific effects. It is probable that the contagion adheres with particular pertinacity to all secretions and discharges from sick animals. For this reason, fæces or droppings, urine, ruminated food, all secretions from the mouth, nose, and eyes, and any sore parts of the surface of the diseased animals must be considered as the principal and primary carriers of the infectious matter or plague poison. It is also probable that many parts of animals which have died from the cattle plague, or have been killed during advanced stages of the disease, are infectious, some because they are primarily imbued with the contagion, others because they have been in contact with it after the death of the animal. Skins, hides, hair, horns,

Infectious parts of dead animals.

and hoofs, must therefore always be treated with precaution. The chances of infection by flesh, fat, cleaned guts, and blood, are perhaps more remote, but cannot be lost sight of.

4. The cattle plague, although affecting every part of the animal, shows its visible effects most extensively in the intestinal canal. It is believed, and apparently upon good grounds, that the intestinal discharges are the principal agents, upon the distribution of which mainly depends the spread of the disorder.

4. Particular danger of droppings, or fæces.

5. It follows from the above, that all articles which have been in contact with a diseased animal, or any of its discharges, particularly its fæces, are capable of carrying the infection for an indefinite time, and must be looked upon as being actually infectious to other healthy animals. Such are racks of wood or iron; cribs or mangers of wood, iron, or stone; articles used for fastening animals; leather collars and straps, ropes and chains; all harness of any animals used for drawing, and all carts, waggons, and carriages which they have actually been drawing; the stalls or sheds in which animals have been standing; the whole lengths of the gutters and drains through which their urine has been flowing; the entire surface over which their manure has been drawn, and all implements with which the removal has been effected; the entire dung-heap upon which infected manure has been put, and the fluid contents of the manure pit; or of the special receptacle for the urine; yards or sheds in which cattle have been kept to tread down long straw, and the whole of such straw and manure, as also the ground beneath them; paths and roads upon which diseased cattle have walked or been carried; fields and meadows

5. Enumeration of infected things and places.

upon which they have been grazing ; all carts, carriages, trucks and railway trucks in which diseased cattle have been conveyed, and all the platforms, railings, bridges, and boards upon which they have been moved thereto ; as also all apparatus which has been used to pen, tie, lift, haul, lower, and fix them ; the clothes, and particularly shoes and boots, and iron-pointed sticks of drivers and their dogs ; the apparel of all cattle-herds or attendants, particularly their shoes and boots ; the shoes and boots of all persons visiting places where diseased cattle are or have been standing ; and, in general, the clothes of all persons visiting infected places, ships, and all parts of the platforms, stages, stairs and bridges, hoists and cranes used for embarking and landing the animals ; markets, and all sheds, and pens, and implements used in contact with cattle ; slaughter-houses, and all persons and implements in them which have been employed upon sick cattle, as also sundry parts or organs which come from sick animals killed in slaughter-houses ; knackers' yards, trucks or carts, horses, men, and implements which have been employed in the disposal of sick or dead animals ; wells and ponds from which diseased cattle have been drinking, or into which any portion of their excreta has had any opportunity of flowing, directly or indirectly ; all fodder, grass, hay, straw, clover, &c., and particularly remnants of fodder upon which diseased cattle have been feeding ; and, in general, all persons, animals, places, buildings, and movable things which have been in contact with matters proceeding from diseased cattle, or with such diseased cattle themselves. To the above-mentioned places and things any of the processes and agents

enumerated and described in the following may have to be applied.

II.—PRACTICE OF DISINFECTION.

II. Practice of disinfection.

A. *Disinfection by Earth.* 1. *Burying.*—All matters that can be buried, so as to remain covered with a thick layer of ground or earth are innocuous. The ground chosen for such interment should be dry. The quickest, and cheapest, and most certain way of disinfecting an animal dead from the plague is to bury it entire.

A. Disinfection by earth.

1. Burying of animals, &c.

2. The droppings, and all straw and other matters contaminated therewith, may also be buried into ground where they are not likely to be disturbed for a long time. The places from which such droppings have been removed to be cleaned and disinfected as will be described below.

2. Burying of dung.

3. Manure heaps and the down-trodden manure of cattle yards, if they have become infected by even a small quantity of the droppings of a diseased animal, should be carefully shifted to a suitable piece of ground, and there be transformed into compost heaps. A layer of manure one or two feet in thickness should be covered all over with six inches of dry earth, ashes, and mineral rubbish; upon this another layer of manure may be placed, and then again a layer of earth, and so forth, until the whole of the manure is stacked; it should be covered all over with a continuous layer of earth of from six inches to one foot in thickness. If the manure heap or yard manure cannot be shifted, it may be covered on the spot with a layer of dry earth, after which all animals are to be kept away from it.

3. Infected manure and compost heaps.

4. Removal of soil infected by soakage.

4. If the floor of any shed or stable in which diseased cattle has been standing is not constructed with special water-tight and impenetrable material, it must be assumed to be infected to the depth of at least six inches. This ground should therefore be removed, together with any stones, pavements, or wood work which may have been in contact with it, carted to a piece of dry land and buried. Half-rotten wood is a particularly favourable carrier of infection. Mortar, bricks, loam, or any other lining of the sides of a pen in which a diseased animal has been standing, should be broken out and buried.

B. Disinfection by fire.

1. Burning.

B. *Disinfection by Fire.* 1. *Burning.*—All infected articles of a minor value, or made of incombustible materials, can be disinfected by exposing them to a heat which will char organic matter. To this class of articles may be reckoned racks of wood or iron; cribs or mangers of wood, iron or stone; leather collars and straps, ropes and chains; dry manure, residues of fodder from which diseased cattle have eaten; and all such small articles of little value which can easily be replaced by new ones. Chains may be exposed to a dull red heat; all other articles may be heated over a fire of coal, brushwood, or straw until well scorched. All new articles of ironware should be bought in a galvanised state, to prevent the formation of rust, the accumulations of which form convenient seats for infectious matter, and for the same purpose it is desirable that iron articles which have been disinfected by heat as above should afterwards be either galvanised, or, at least, while hot be treated with resin, to cover them with a durable varnish, or should be varnished or painted.

C. *Disinfection by Chloride of Lime.*—Chloride of lime, or bleaching powder, is the most powerful, the cheapest and most easily managed of all artificial disinfectants. It can be had everywhere, and at any time, and in quantities sufficient for every purpose. It should as much as possible be applied in solution, of a strength varying somewhat with the particular purpose for which it is to be employed; and after it has been allowed to act upon the surface or matter to be disinfected a reasonable time, should be washed off, together with all products of decomposition. As chloride of lime does not destroy only the infectious matter in a mixture, but destroys all organic matter without distinction, it is not applicable to large quantities of matter, such as the manure of cattle, dung-heaps, &c., inasmuch as twice or three times the weight of these matters of chloride of lime would be required for their effectual destruction and disinfection. It is further inapplicable to all matters rich in ammonia, particularly putrid urine, as it destroys the ammonia and evolves a large amount of gases, some of which have a repugnant odour, and are perhaps not quite innocuous. But for the disinfection of surfaces of things and places no better or more suitable agent than chloride of lime is at present known to science.

C. Disinfection
by chloride of
lime. General
remarks.

D. *Special Directions for the Disinfection of Stables, Sheds, Vans, Railway Trucks, and Cattle Ships,* and of Persons and Things connected with them.*—1. After such a place has been cleaned by mechanical means, scraping, &c., as much as possible, and all manure and

D. Special directions for disinfection of stables, sheds, &c., trucks, and ships, &c.
1. Special directions.

* For the disinfection of railway trucks and cattle ships, see Special Memorandum.

Washing.

Scrubbing.

All washing
water to be dis-
infected.

2. Actual dis-
infection.
Solution of
chloride of lime.

How applied.

dirt has been carefully buried, the entire surface which has been contaminated, or is likely to have been contaminated, should be covered with a layer of chloride of lime in powder. The powder should be worked about with a broom until equally distributed. It is intended to disinfect the water to be used in the washing process which is now to commence. Clean water, from a hose in which it flows under pressure, or from a force-pump, garden-engine, or from large watering-pots or water-cans, or poured freely from buckets, should now be applied to the entire surface by one person, while another at the same time scrubs the entire surface; and particularly all crevices, joints, and irregularities. The washing water and chloride of lime are then to be worked down the gutters, into the sinks, cesses, or natural watercourses. No washing water from any infected place or thing should ever be allowed to flow into any cesspool, urine-hold, dung-heap, pond, sewer, or natural watercourse, without having previously been mixed and stirred with a liberal amount of chloride of lime. When the place has thus been scrubbed until the water flows off clean, it is ready for effectual disinfection.

2. For this purpose a solution of chloride of lime in water, in the proportion of one pound of the powder to one gallon of water, is made. For the lair of one animal from six to ten gallons of such fluid should be prepared. This fluid is now distributed over the whole surface to be disinfected, gradually, by squirting from a syringe, or by pumping through a force-pump, garden-engine, or by watering from a watering-pot or can with a finely pierced rose. All woodwork, stones, bricks, cement, mortar, all fixtures of whatever mate-

rial, should be well wetted with the solution, and immediately be scrubbed with a hard brush. Floor and ceiling are also scrubbed, and the whole is left in this wet state covered with the chloride of lime solution for at least one hour, during which time care is taken that no parts become dry. How long to be left on.

3. As the chloride of lime and the products of its decomposing action upon infectious matters may be hurtful to cattle, these matters have to be carefully washed off by a second and final flushing. For this too much water and too much scrubbing cannot be employed. Care should be taken to apply the clean water always to the highest parts, so as to cause it to flow thence to the lower parts, and to wash away the waste from the lower parts before applying any fresh water to the upper parts. 3. To be washed off after disinfection.
Flushing.
Precautions as to direction of clean water.

4. Care should also be taken to rinse and flush every broom which has worked away sediment and waste from the lower parts into and through the gutters and drains before applying it again to the clean upper parts. Care should also be taken that the working persons should not step from the dirty or partially cleansed places on to the clean ones, as this may suffice to bring infection back to the disinfected place. 4. Care not to carry back dirt by brooms, boots, &c.

5. Lastly, all persons employed in this work, having swept and flushed the gutters with the same care as the lairs, are collected, together with all engines and tools which they have used, as near as possible to the sink or place of final egress of water from the premises, and there disinfected as will be described. 5. Disinfection of workmen and tools.

The tools, such as hooks, forks, spades, hoes, barrows, &c., are scrubbed with the above solution of chloride of lime, and subsequently water until clean ; they are Tools.

then repeatedly wetted with the solution, and after it has had time to disinfect the entire surfaces of them, they are washed clean and laid up, or hung up to dry.

Workmen.

The workmen, then, having finished the disinfection and flushing of all objects and surfaces, effect their own

Disinfection of boots.

disinfection in the following manner:—They wash their boots most carefully with chloride of lime and water, scraping the soles and scrubbing the seams

Disinfection of workpeople's bodies, hands, &c.

Changing and disinfecting clothes.

where the soles join the upper leather. They wash their hands and arms, and by means of clean rags or sponges they remove any splashes from their clothes. After this they go indoors, remove all clothes from head to foot, wash their bodies, and particularly their hands, faces, hair and feet, with plenty of soap and water, and put on fresh clothes and linen. The clothes and linen which they have taken off should be treated as infected, set to soak immediately in boiling water and afterwards disinfected, or in water containing two ounces of chloride of lime to the gallon in solution, or containing four ounces of Condy's red permanganate of potash fluid in solution; or the clothes and linen should be put in a copper and boiled and subsequently washed. All articles of little value which are much soiled should be burned on a bright fire.

Burning of articles of little value.

E. Disinfection of live stock.

1. Stock may carry infection in two modes.

E. Disinfection of Live Stock.—1. Live cattle may carry infection in two ways : first, by being themselves infected with the plague and reproducing the poison ; and secondly, by accidentally carrying the poison from other animals in a dormant state upon some part of their surface, their hair, and particularly their feet. These latter animals may therefore infect others without being or becoming themselves subjects of the

plague. All persons therefore buying new animals, should disinfect them before allowing them to enter their premises. In a similar manner, if in a stable there has been a case of plague, the healthy or apparently healthy animals should all be disinfected.

2. The mode in which live animals may be disinfected, consists in washing them with disinfectant solutions of such strength as will destroy the contagion without injuring the surface of the animal. A solution of two ounces of chloride of lime in a gallon of water, is a proper solution for washing the coat of animals. A mixture of four ounces of Condry's red permanganate of potash fluid, with one gallon of water, is also a proper disinfectant solution. For full-sized cows and bullocks, &c., several gallons of either of these solutions should be used. Great care should be taken to keep the solution away from the eyes, nostrils, mouth, and tender parts. When the entire surface is washed and disinfected, all disinfectant is removed by the application of great quantities of clean tepid water to all parts. The animal is given a warming and refreshing drink, and is conducted by a clean attendant to the clean quarantine shed. There it should receive fodder both dry and green, and sop, and plenty of pure cold water, and be rubbed dry with whisks of straw and hay.

2. Mode and means of disinfecting live stock.

Warming and refreshing drink.

Penned in the quarantine shed.

F. *The Quarantine Shed.*—1. The quarantine shed is intended to keep the new and suspected cattle separate for a period of at least ten days, in order to afford the security, to be obtained by observation alone, that it is not actually infected with plague. While, therefore, disinfection of the surface of cattle removes one

F. The quarantine shed.
1. Objects.

Both quarantine and surface disinfection are required.

kind of danger, another, which cannot be removed, can only be kept circumscribed or penned in, and this is done by the quarantine shed. But the keeping of cattle in the quarantine shed would not disinfect its surface with certainty even during a much longer period than ten days ; disinfection of the surface therefore cannot supply the precaution of the quarantine shed, and a rigorous quarantine cannot supply the effect of surface disinfection. Both precautions are necessary for perfect security, although either of them, without the other, obviates a particular kind and a certain amount of danger.

2. Management of the quarantine shed.

2. The quarantine shed should be situated in an isolated part of the premises. All manure and urine from it should flow and be carried to a particular place separate and distinct from the common dung-heap, and be buried daily.

Cleanliness.

The utmost cleanliness should be observed in the shed. All tools, pails, currycombs, etc., used in this shed should be used in it exclusively and nowhere else. The person attending the quarantine shed should not be allowed to go into the shed where healthy stock is kept, or permitted to approach healthy stock. No person attending healthy stock should be permitted to approach quarantine cattle, or to go near or into the quarantine shed. But should unfortunately only one person be available for both duties, that person should be allowed to approach quarantine cattle only when clothed in the safety dress to be immediately described.

Persons attending healthy stock not to attend quarantine shed, and vice versa.

G. The safety dress.

1. Description.

G. *The Safety Dress*.—1. This consists of strong water-boots reaching up to the knees, well greased all over ; of a waterproof coat, buttoned close all the way

up in front, and closing tightly round the neck and wrists. The head is to be covered with a cap which takes the hair well in.

2. Every person having occasion to visit sheds in which there is diseased cattle, or suspected cattle, or quarantine cattle, should be provided with the above dress, put it on when entering the place, take it off when leaving the place, and have it disinfected immediately. This precaution should be strictly observed by all inspectors, all veterinarians, or others called in to attend sick cattle, by all dealers and butchers entering sheds, yards, or meadows, for the purpose of sale or purchase, and by all other persons coming on the premises on business in connexion with cattle.

2. Persons who should use the safety dress.

To disinfect before leaving suspected or infected premises.

3. The owners of stock should not allow any strangers to enter their sheds, yards, or meadows, except in disinfected safety-dresses; and in case this should give rise to difficulties, they will do well to have themselves one or two such safety-dresses at hand, and to cause all persons whose business compels them to enter their sheds, to leave their own boots behind, and to put on the long boots, waterproof-coat, and special cap. Only thus can they hope to exclude all ordinary and obvious chances of infection from their previously healthy sheds, yards, and meadows.

3. Strangers not to enter sheds except in disinfected safety dresses.

Proprietors of cattle to keep safety dresses.

H. *Measures to be taken on Premises where Plague has actually appeared.*—1. When the plague has actually appeared in any shed, yard, or place, the sick animal should at once be removed with all due precautions. It is certainly the safest and best to pole-axe the animal at once, and to bury it entire, and then to disinfect the particular lair as above described, clear

H. Measures to be taken where plague has appeared.

Killing and burying diseased animals.

Disinfecting
the living and
the stables.

out the stable or shed, disinfect the whole of it and all apparatus, also all the animals, and only to let the animals enter the shed, &c. again, after it is completely sweet and dry.

2. Hospital
shed.

2. If, however, a proprietor is desirous of keeping a sick animal because its illness does not appear severe or fatal, he should place it in a separate shed, which must not be the same as or near to the quarantine shed, and be distant from all healthy animals, and so situated that the prevailing wind does not blow from this hospital shed towards the healthy or quarantine shed. The water should also not flow from this hospital shed towards the others, or the yard, or any meadow, but should be carefully drained away and sent off the premises by a special sink.

Situation of.

3. Preventing
of diffusion of
fæces.

3. To prevent the scattering of fæces by infected animals (and also by suspected animals and all animals suffering from diarrhœa), their tails should be so tied to one or other of their horns as to protect them against being soiled by the intestinal discharges, and to prevent them from distributing such discharges by the ceaseless motions peculiar to these organs. The spattering of fæces should be prevented by a copious supply of rough straw, with some sand, sawdust, or ashes placed behind and underneath the animal. The straw and fæces should be dealt with as has been described. Animals affected with plague or diarrhœa should not be led along streets, highroads, and paths, as they would be certain to drop infectious fæces, which would then be distributed over the entire length of these roads by the feet of men and animals, and the wheels of vehicles.

4. The sick animals should be disinfected repeatedly; their pens should be cleaned and disinfected repeatedly, during the course of the illness. This should be done by persons either guarded by the safety dress, or—and this is safest—by such as may not come into contact with healthy cattle, or have to enter healthy sheds. All tools, pails, fodder, &c., to be used in the hospital shed to be kept for that purpose only, and never to be used with healthy, or quarantine, or only suspected cattle.

4. Special management of hospital shed.

Persons to be employed.

5. If the proprietor of any dead piece of cattle, whether it has died naturally or been killed, should decide upon dismembering it instead of burying it entire, and upon utilising the hide, horns, hoofs, tallow, and bones, he should disinfect the skin, horns, and hoofs, by steeping them for one hour in a strong solution of chloride of lime, containing one pound of the powder in each gallon of water, and afterwards washing them. The tallow should be thickly powdered with chloride of lime all over, and be sent directly to the boilers. It should not be boiled in any vessel employed on the farm. Under all circumstances, it is advisable to let this dismemberment of dead and fallen cattle be performed at the knacker's yard.

5. Disinfection of parts of dead or killed animals.

6. Flesh, blood, guts, lungs, and the bones of the head of infected animals should not be trafficked with, as they cannot easily be disinfected. They should always be buried.

6. Flesh, &c., to be buried.

I. *Disinfection of Meadows, Fields, Roads, &c.*—
1. Meadows infected by diseased cattle should be carefully cleaned of all dung, by burying each dropping on the spot where it lies, cutting out the round piece of

I. Disinfection of meadows, fields, roads, &c.
1. Meadows.

turf with the dropping on it, and turning it upside down. The grass on the entire meadow should then be cut and burned. It should then be left without any cattle for at least a month, including at least two wet days.

2. Of roads,
&c.

2. All roads, paths, streets of towns, or villages should be carefully and frequently scavenged. All carts, vans, or waggons used for carrying manure, should be water-tight, caulked and painted, and should not be permitted to ooze and drop their fluid or semi-fluid contents on the road over which they are drawn. They should be kept clean and disinfected, as a precautionary measure, by the proceedings above described.

III. General
recommendations.

III.—GENERAL RECOMMENDATIONS.

In conclusion it must be pointed out to farmers, dairymen, and all persons having charge of cattle,

That the same great measures which are known to maintain and restore the health of human beings, will also maintain and restore the health of cattle.

Pure air ; dry, spacious, well-ventilated and well-drained clean sheds ; clean and dry meadows ; plenty of pure water ; frequent currying and washing ; the prevention of the development, by the destruction of the germs, of internal and external parasites, particularly entozoa ; proper food in suitable quantities, and at proper times ; protection from inclement weather ; the utmost cleanliness in the removal of manure ; the storing of the manure at a great distance from the cattle-shed, and, in addition, the most conscientious observance of the precautionary and disinfecting measures above described—all these measures and agents

together will secure the utmost possible health of stock and the prosperity of the agriculturist and dairyman. But the neglect of any one of them will make the stock liable to become infected, and the more so the more several or all collateral conditions of the healthy existence of animals are neglected. The negligent man is therefore certain to lose, to injure his neighbour by defeating his precautions, and to damage society ; but the watchful and painstaking man will be rewarded not only by the preservation of his property, but particularly by the consciousness that it has been preserved by his own care and attention, and that thereby he has also benefited the state.

This consolidates and amends the former Orders.

(Copy.)

At the *Council Chamber, Whitehall*, the 22nd day of *September*, 1865.

By the Lords of Her Majesty's Most Honourable
Privy Council.

PRESENT.

Lord President.

Duke of Somerset.

Earl of Clarendon.

Earl de Grey and Ripon.

Mr. Secretary Cardwell.

Mr. H. A. Bruce.

WHEREAS by an Act passed in the session of the eleventh and twelfth years of Her present Majesty's

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reign, chapter one hundred and seven, intituled "An Act to prevent until the 1st day of September, 1850, "and to the end of the then next session of Parliament, "the spreading of contagious or infectious disorders "amongst sheep, cattle, and other animals," and which has since been from time to time continued by divers subsequent Acts, and lastly by an Act passed in the session of the twenty-eighth and twenty-ninth years of the reign of Her present Majesty, chapter one hundred and nineteen, it is (amongst other things) enacted that it shall be lawful for the Lords and others of Her Majesty's Privy Council, or any two or more of them, from time to time, to make such Orders and Regulations as to them may seem necessary for the purpose of prohibiting or regulating the removal to or from such parts or places as they may designate in such Order or Orders, of sheep, cattle, horses, swine, or other animals, or of meat, skins, hides, horns, hoofs, or other part of any animals, or of hay, straw, fodder, or other articles likely to propagate infection ; and also for the purpose of purifying any yard, stable, outhouse, or other place, or any waggons, carts, carriages, or other vehicles ; and also for the purpose of directing how any animals dying in a diseased state, or any animals, parts of animals, or other things seized under the provisions of the said Act, are to be disposed of ; and also for the purpose of causing notices to be given of the appearance of any disorder among sheep, cattle, or other animals, and to make any other Orders or Regulations for the purpose of giving effect to the provisions of the said Act, and again to revoke, alter, or vary any such Orders or Regulations ; and that all provisions for any of the purposes aforesaid in any such Order or Orders contained shall have the like force and

effect as if the same had been inserted in the said Act; and that all persons offending against the said Act shall for each and every offence forfeit and pay any sum not exceeding twenty pounds, or such smaller sum as the said Lords or others of Her Majesty's Privy Council may in any case by such Order direct:—

And whereas a contagious or infectious disorder now prevails among the cattle of Great Britain, which is generally designated the "cattle plague," and may be recognised by the following symptoms:—

"Great depression of the vital powers, frequent shivering, staggering gait, cold extremities, quick and short breathing, drooping head, reddened eyes, with a discharge from them, and also from the nostrils, of a mucous nature; raw-looking places on the inner side of the lips and roof of the mouth, diarrhœa or dysenteric purging:"

And whereas several Orders, dated respectively the 24th of July, the 11th, 18th, and 26th of August, 1865, have been made under the authority of the said Acts by the Lords of Her Majesty's Privy Council, with a view to check the spreading of the said disorder:

And whereas it is expedient to consolidate and amend the said Orders:

Now, therefore, the Lords of Her Majesty's Privy Council do hereby, by virtue of, and in exercise of the powers given by, the said Act, so continued as aforesaid, order as follows:—

1. This Order shall extend to all parts of Great Britain.

2. The said Orders dated respectively the 24th of July, the 11th, 18th, and 26th of August, 1865, are revoked, with the exception of so much of the said Order

of the 24th of July, 1865, as empowers the Clerk of Her Majesty's Privy Council to appoint Inspectors within the limits of the Metropolitan Police District, provided that such revocation shall not affect any appointment made, or any act done, or penalty recoverable, under any Order hereby revoked.

3. In this Order the word "animal" shall mean any cow, heifer, bull, bullock, ox, calf, sheep, lamb, goat, or swine; and the word "Inspector" shall include any Inspector appointed under this Order, or under any of the said revoked Orders.

4. Whenever the Local Authority, as hereinafter defined, shall be satisfied of the existence of the said disorder in, or have reason to apprehend its approach to, the district over which his or their jurisdiction extends, it shall be lawful for such Local Authority, if he or they shall think fit, from time to time to appoint one or more Veterinary Surgeon or Surgeons, or other duly qualified person or persons, to be an Inspector or Inspectors, for the purpose of carrying into effect the rules and regulations made by this Order, within the district for which he or they shall have been appointed. And the same authority may, from time to time, revoke such appointment.

5. Subject to the powers herein reserved to the Clerk of Her Majesty's Privy Council, the Local Authority within the City of London, and the liberties thereof, shall be the Lord Mayor; in any municipal borough in England or Wales, the Mayor; in any Petty Sessional Division in England or Wales (exclusive so far as relates to the jurisdiction of the Inspector of so much of the said division as lies within the limits of a municipal borough for which an Inspector has been appointed),

the Justices acting in and for such Petty Sessional Division. The Local Authority in any burgh or town in Scotland which is subject to the jurisdiction of a Provost or other Principal Magistrate, shall be the Provost or such Principal Magistrate; and in any other place in Scotland not within the jurisdiction of such Provost or other Principal Magistrate, the Justices of the County in Sessions assembled.

6. Every Inspector shall from time to time report to the Local Authority by which he is appointed, the steps taken by him for carrying into effect the regulations prescribed by this Order; and the Local Authority shall certify, in such manner as may be directed by one of Her Majesty's Principal Secretaries of State, the number of days that such Inspector has actually been engaged in the performance of his duty, and the number of miles travelled by him while thus engaged.

7. Every Inspector shall furnish the Lords of the Council with such information in regard to the said disorder, as their Lordships may, from time to time, require.

8. Every person having in his possession, or under his custody, any animal labouring under the said disorder, shall forthwith give notice thereof to the Inspector of the district within which such person resides, or if no Inspector shall have been appointed for the district within which such person resides, then to the Officers herein-after named, according to the place of residence of the person obliged to give notice; that is to say: within the Metropolitan Police District, to the said Clerk of the Privy Council; within the City of London, and the liberties thereof, to the Lord Mayor; within any other borough, burgh, or town subject to the jurisdiction of a

Mayor, Provost, or other Principal Magistrate, to such Mayor, Provost, or other Principal Magistrate; elsewhere in England, to the Clerk of the Justices acting in and for the Petty Sessional Division; and elsewhere in Scotland, to the Clerk of the Peace of the county.

9. Every Inspector shall have power to enter upon and inspect any premises or place in which any animal or animals may be found within the district for which he is appointed, and to examine and inspect, whenever and wherever he may deem it necessary, any animal within such district.

10. Every Inspector shall have power within his district to seize and slaughter, or cause to be seized and slaughtered, and to be buried, as hereinafter directed, in any convenient place, any animal labouring under the said disorder.

11. Every Inspector shall have power within his district to cause to be cleansed and disinfected, in any manner which he may think proper, any premises in which animals labouring under the said disorder have been, or may be, and to cause to be disinfected, and if necessary destroyed, any fodder, manure, or refuse matter, which he may deem likely to propagate the said disorder. And every owner or occupier of such premises shall obey any order given by such Inspector for that purpose.

12. Every Inspector shall have power within his district to direct that any animal which he suspects to be labouring under the said disorder, shall be kept separate from animals free from the said disorder. And every person having in his possession, or under his custody, such animal, shall obey any order given by such Inspector for that purpose.

13. Every person having in his possession, or under

his custody, any animal labouring under the said disorder, shall, as far as practicable, keep such animal separate from all other animals, and shall not, if the animal be within a district for which an Inspector has been appointed, remove the same from his land or premises, without the licence of the Inspector.

14. No person shall send or bring to any fair or market, or expose for sale, or send or carry by any railway, or by any ship or vessel coastwise, or place upon, or drive along, any highway or the sides thereof, any animal labouring under the said disorder.

15. No person in any district for which an Inspector has been appointed shall, without the licence of the Inspector, send or bring to or from market, or remove from his land or premises, any animal which has been in the same shed or stable, or has been in the same herd or flock, or has been in contact, with any animal labouring under the said disorder.

16. No person shall place, or keep, any animal labouring under the said disorder in any common or unenclosed land, or, if the animal be in a district for which an Inspector has been appointed, in any field or pasture, where, in the judgment of the Inspector, such animal may be likely to propagate the said disorder.

17. All animals having died of the said disorder, or having been slaughtered on account thereof, shall be buried with their skins, and with a sufficient quantity of quick-lime, or other disinfectant, as soon as practicable, and shall be covered with at least five feet of earth, or shall, in districts for which an Inspector has been appointed, with the consent of the owner, be otherwise disposed of, in manner directed by the Inspector.

18. During the continuance of the "cattle plague"

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within the said City of London, or that part of the Metropolitan Police District which is under the jurisdiction of the Metropolitan Board of Works, no animal shall be brought or sent to the Metropolitan Cattle Market, or any other market within the said City or the said part of the Metropolitan Police District, except for the purpose of being there sold for immediate slaughtering; and every such animal, as soon as sold, shall be marked for slaughter, in the manner in which cattle are ordinarily marked for slaughter in the Metropolitan Cattle Market.

19. Whenever any Local Authority, as hereinbefore defined, declares, by notice published in any newspaper circulating within his or their jurisdiction, that it is expedient that animals, as hereinbefore defined, or some specified description thereof, shall be excluded from any specified market or fair within that jurisdiction, for a time to be specified in such notice, it is hereby ordered, that after the publication of such notice, it shall not be lawful for any person to bring or send such animals or description thereof into such market or fair: provided always, that this clause of this Order shall not, unless renewed by a further Order, be in force after the expiration of three calendar months from the date of this Order.

20. Every person offending against this Order shall, in pursuance of the said Act, for every such offence forfeit any sum not exceeding twenty pounds which the Justices before whom he or she shall be convicted of such offence may think fit to impose.

(Signed) ARTHUR HELPS.

THIRD PART.

To Farmers and Graziers.

You would have had just cause to reproach me with a want of common sense if I had obliged you to read a book of two hundred pages, and to lose your time in looking for the advice you will require, if the cattle plague should visit your stalls and herds, instead of being able to turn at once to the matter which concerns you. I have taken up my pen on purpose to be of service to you; this is my principal duty, which I am now going to fulfil by summing up in a few pages the most important facts which have been described in the two first parts of this work.

The cattle plague, which has lately fallen upon horned beasts, is a plague, no doubt: but there are different species of plagues, and it is necessary that you should know that this

disease is one arising from the absorption of seeds and germs with which the air is impregnated, and which is drawn by the animals into their bodies when breathing the air around them. When these germs, these infectious poisons, have penetrated into the lungs and blood of the animals, these seeds of infection remain there from eight to twelve days without producing any very perceptible effects ; but after that time the tainted animal becomes dejected, loses his appetite, is seized with fever, laborious breathing, and diarrhœa, to which sum of disorders in the health of oxen, cows, &c., the name of *typhus* has been given ; or, as this distemper is contagious in the highest degree, it has also been called the *contagious typhus*.

You may compare this disease, in order to form a more precise idea of it, to the small-pox, which sometimes afflicts your children, or to typhoid fever. These complaints, which are familiar to most of you, have some resemblance to the typhus of the ox. Only in the small-pox, which is caught by contagion, and which seldom attacks more than once, like typhus, the disease is localized

on the skin ; whilst in the cattle plague the internal organs are the principal seat of the evil.

This comparison will show you at once that the cattle plague, or rather the cattle typhus, can only be cured when the disease has run its full course, as you have observed in a person tainted with small-pox ; so that your task must be to help the sick animal to endure his complaint until the end, or until he is cured ; and you must not attempt to check it by violent means, for if you did you would hasten the death which you desire to prevent. You will likewise understand that if the disease—as is certainly the case—does not attack the same animal twice, it would be very beneficial to inoculate the animal whilst he is sound and healthy, whenever this scourge threatens—as in the present time—to attack all cattle. Perhaps you may be told that inoculation, which prevents small-pox in man, cannot be applicable to cattle ; that animals inoculated with the virus of the typhus have all died of the consequences of the operation, and so on. To all these objections you will answer, with that downright good sense which belongs to your class, *that Nature cannot have*

two weights and two measures ; and that if the inoculation of the typhus kills animals, whilst the inoculation of the small-pox saves men, both maladies being governed by the same laws, it is the inexperience of physicians, and not the operation itself, which must be made to account for it.

In a word, to sow virus is to reap it ; but there are many ways of sowing it, and one man will reap a rich harvest, whilst another shall gather nothing but tares. Let those unbelievers say what they like, and take my word for it, that we shall one day cure typhus as frequently as we do small-pox, by inoculating it, and when it appears in spite of that course, by treating it medicinally.

This contagious disease is very frequent in certain countries, principally in Russia and Hungary, on the banks of the great rivers which empty themselves into the Black Sea. In those remote countries, when the seasons are either too rainy or too hot—and you know what a summer that of 1865 has been—the pastures generate the pestilential poisons of the typhus, the cattle absorb these destructive principles, and die of them.

But as the herds of cattle in those countries are bred for sale, and are sent for that purpose to other countries, to France, Italy, England, &c., the animals which have had the germ of the disease transport it with them wherever they go. Thus, it is certain that some oxen conveyed from Russia and Hungary, where the typhus frequently rages, brought the disease with them into Great Britain in the month of last June; and as the complaint is communicated from one animal to another, and afterwards at great distances, it spread with great rapidity over England and Scotland. So great are its powers of contagion, that some of the cattle sent back from England have transmitted the disease to Holland, in the first place, and afterwards to Belgium; and it was feared at one time that all Europe would be invaded by it.

The first belief was—and everything tends to make good the opinion—that the typhus originally came from abroad; but many respectable authorities, seeing the foul and nauseous state of the stalls and cowsheds both in London and elsewhere, the overcrowding of the animals, and the general neglect to

which they are exposed, have asserted that the disease had its origin in London. This, we repeat, is not likely to have been the case, but it is not absolutely impossible; at all events, there can be no question that the grievous conditions in which some of your brethren keep their cattle have contributed to spread the distemper, independently of other causes.

Moreover, it is necessary to tell you, that sheep and horned cattle are of all living animals those which are most sensitive to the influence of contagious diseases. Every year you see instances of this fact in your own fields and meadows. Your sheep, you all know, easily contract the small-pox, worm diseases both on the skin and in the interior of the body; your oxen have apthous diseases, disorders of the blood and the lungs, scabs and carbuncles—diseases which are all more or less contagious, and which are generally brought on by want of care, and, above all, by improper feeding: by which you see how much of the sufferings of the cattle, and of the heavy losses to you which follow them, depends upon yourselves and may be

avoided. Besides, these poor creatures, which some of you treat so harshly, are extremely susceptible, and the blows they receive may easily affect their whole mass of blood. You must, therefore, for your own sakes, treat them more kindly and gently.

Therefore, the typhus which was imported from Russia into England, finding your cattle in such wretched conditions of cleanliness and health, was propagated amongst them with fearful rapidity. When once the disease had developed itself within your sheds and stalls, it would have been the wisest plan immediately to kill the sick cattle, or to treat them medicinally, carefully abstaining from driving to market any of your beasts which had been exposed to the contagion. But unfortunately you did not act in this manner; many amongst you could not put up patiently with your losses, and only consulting your private interest, to the detriment of the general good, you sold your sick cows and oxen, and sowing the contagion about the country and through the markets, the scourge was soon scattered in every direction, so that instead of stifling the disease at its birth

everything was done to propagate and diffuse it.

Now, if we add, that the germs of this typhus penetrate everywhere, that it is sufficient to convey sick cattle along the public roads, and by this means to pass near farms and meadows containing healthy cattle, to transmit the contagion, that these noxious germs impregnate your own clothes, the fleece of sheep, and every article, implement, and vehicle used in agriculture, you cannot but see how often, though unwillingly, you must have disseminated the evil far and wide.

The germs, the miasmata of the disease, insinuate themselves not only upon animals and men, but they shed their virus upon the grass of the fields, the walls of the stalls and stables, and every agricultural utensil. Every tainted animal scatters the pestilential and contagious germs, not only by the air he expires, but by his droppings, and after death by his mortal remains—his hide, his horns, his entrails, his flesh—all of which disseminate the deadly germs into the atmosphere, which afterwards diffuses them in every direction.

The germs of this virulent distemper have no doubt smitten some cattle which appeared in the best health and conditions, those of the rich as well as those of the poor; but, just in the same manner as the cholera chiefly fixes itself upon the sickly, the ill-fed, the unclean, upon those who live in crowded dwellings and badly ventilated rooms; so, too, does the typhus choose its victims among the stalls and stables of those graziers who keep their cows tied up for years to the rack, giving them neither air nor exercise, and feeding them, not on that diet which their health requires, but on those things which add to their milk and increase their flesh. It follows, of course, that the greater number of these cows, more or less disordered by this long course of baleful treatment, and many of which die of consumption, after their deteriorated milk has infused into men the seeds of diseases, must afford an easy prey to the typhus, *to receive which they seem almost expressly to have been trained.*

It is highly important then, farmers and graziers, that you should be able to recognise this ox-typhus; in the first place, that you may take the necessary measures to prevent its

contagion ; and secondly, that you may apply the treatment which shall have been recommended to you.

You must at all times, but above all when the contagious disease is raging, keep a watchful eye on your cattle. If you notice in their gait, in their looks, about their ears, any unusual signs ; if they seem to you less eager, less active, less vigilant, if they leave any part of their rations when in the stables, or if, when in the fields, they no longer browse with that continual alacrity which sometimes it is difficult to divert them from, be upon your guard, and dread the outbreak of the complaint. If to these changes of minor importance is added an appetite really less acute, if the rumination is less regular, if the animal looks sad and dispirited, if he exhibits an unwonted look of gloom, if his leaden eye continues fixed, astonished, be sure a morbid change is inwardly at work, and that this cruel distemper is spreading through his frame.

By-and-bye the animal loses his appetite more and more ; rumination is shorter and less frequent ; he holds his head down, his ears sink and fall ; he grinds his teeth. Then as

to the cows: their milk, which was already diminished, suddenly dries up altogether, and that lowness of spirits which had been visible for some days before, passes into stupor. If at this time you touch their horns, their extremities, their hide in any part, you find that all these different parts are sometimes warm, sometimes cold. From this day forward you will witness, one by one, a succession of disorders in the animal's health: partial shiverings at the attachment of the fore and hind limbs, loud panting breathing, with slight cough, the urine scanty and thick, the droppings hard and constipated, and finally, general excessive warmth. If you press the back the pressure will be painful, and all the signs of intense fever will be manifest.

Already these indications have divulged the nature of the malady you have to deal with; but others more significant succeed them which remove every doubt. The breathing becomes more hurried and oppressed, more puffy; from the eyes, nostrils, and mouth there issues a discharge which, thin and irritant at first, soon becomes thick and purulent, and of a fetid smell. Diarrhœa takes the place of

constipation ; the sexual organs of the cow are red and inflamed, and furrowed with livid streaks. The cattle grow leaner and leaner, some of them dying at this period. If they still hold out, the diarrhoea becomes more frequent, more fetid, and sometimes bloody ; gases are developed under the skin, along the spine, where they form wide flat tumours, which crackle when pressed upon with the fingers. Finally, the mucus which runs from the head becomes still thicker and more fetid ; a glutinous foam stops up the mouth ; the eyes, filled with humour, sink in the orbit ; the bodily warmth decreases, the animal sways his head from right to left, becomes insensible, cold ; his head lolls on one side, and he dies, panting, from exhaustion and asphyxia, the tenth or twelfth day after the disease has been confirmed.

The carcass exhibits a repulsive appearance ; the hide is dry, excoriated, and cracked ; it sticks to the bones, which show the form of a skeleton, and the putrid decomposition, which had already set in before death, seizes rapidly on all the tissues.

The course of the disease is not always the

same. Sometimes the animal is agitated at first, and all the functions of life are so disturbed that death comes on in the two or three first days. At other times, the lungs are more affected than the other internal organs; the cough is more intense, the breath hurried and obstructed, the excess of mucus preventing the air from passing into the chest.

When once you have seen this disease it is impossible to mistake it for any other, unless it be the chest complaint called peripneumonia, which is likewise contagious. But in this disease, as the Report of the Royal Agricultural Society states, the attack is generally insidious; the eyes preserve their vivacity, and the appetite is not lost until towards the close. A short, dry cough shows itself from the outbreak, and persists. The breathing is frequent and painful; the sides of the chest when struck with the fingers give out the hard, solid sound of a full barrel, this percussion being painful. The eyes, nose, and mouth do not discharge those purulent secretions seen in typhus; the diarrhoea only comes on at the end, being less frequent and fetid. In the milch cows the milk decreases, but is not quite

suppressed. The heat of the horns and lower extremities is retained. The peripneumonia, in a word, runs its course more regularly, and carries off the animal about the fourth week. Thus it will be seen that the two distempers widely differ in their symptoms.

Every beast which dies of the contagious typhus, bears on its digestive organs the traces of the malady, more or less strongly marked. The third and fourth stomachs and the intestines exhibit red or livid patches, and at other times ulcerations.

The cattle plague is by far the most formidable malady which can affect animals. When left to itself, or treated without discernment, it carries off ninety cattle out of a hundred. In prior visitations, especially that of 1750, when six millions of horned beasts were swept off in Europe, England lost from three to four hundred thousand; and we may suppose that the number of cattle which have perished since last June exceeds sixty thousand.

The treatment is very difficult, owing to the contagious character of the disease, and it has given rise to much discussion. In some countries, the governments, considering the dis-

temper incurable, only seek to stamp it out wherever it may appear. They slaughter all the sick cattle, and even those which had come near them, allowing a compensation of half the value of the beast. This measure has not always proved successful, the disease having in spite of it sometimes extended over the whole of the country thus defended from its diffusion.

England protected by the sea, and which has been spared for a century, was taken somewhat unawares, so that some uncertainty has been witnessed in the measures employed to arrest its course. In some districts, the parties interested have had the good sense to form assurance funds; and it is much to be regretted that the same plan has not been adopted for the metropolis.

But we cannot help what has been done; let us, therefore, be reconciled with the past, and see what is best to be done in future for the interests of all. What is the present state of the matter? A certain number of districts, both in England and Scotland, are still exempt from the typhus; in others the disease is generally extending its ravages.

Those districts which hitherto have been

spared, should institute assurance funds, and take every precaution to secure themselves against this scourge. In France, in Belgium, even in Great Britain, some places managed, in 1750, to successfully protect themselves by prohibiting the importation of any foreign cattle or animal. These preventive measures may now be taken with some chance of success in certain parts. Ireland, which, thanks to the published Orders in Council, seems to have escaped up to this time from the contagion, shows us the effectual results of these sanitary measures.

As for the districts already infected, it is of the highest importance to send no more tainted beasts to the different fairs and markets, otherwise the distemper will spread indefinitely: the unsold cattle, the sheep, the pigs, which are placed only a few yards apart, must necessarily convey the contagion everywhere. It would even be necessary at this time not to collect oxen and other animals together in the same markets; we urgently invite the attention of all public authorities to this most important question.

At all events, the farmers and graziers who, after all the cautions they have received, all

the orders which have been published, and all the dangers which have been clearly exposed to them, should still persist in driving their cattle out of their abodes, would deserve censure, and ought to be heavily fined. The best they can do, since the contagion has not been prevented, is to submit their cattle to the treatment which we are now going to explain to them in detail.

It has been abundantly proved by the many convictions at the various police courts, that the flesh of cattle seriously diseased has been sold to the consumers, to the great injury of the public health ; and if the cholera, which is steadily and surely advancing towards us, should mix its fatal germs with those of the ox-typhus, we must all expect deplorable consequences, in case the flesh of tainted oxen should continue to be sold by the butchers, as during the last three months it has been.

Every farmer or grazier who shall have fully ascertained that the ox typhus has insinuated itself into his farm or his stables, must instantly have recourse to the necessary measures and safeguards by means of which he may limit its pernicious influence, and prevent

the spread of the contagion to his other cattle still sound and healthy. Let him immediately divide his stock of animals into three classes or lots—the first class must consist of healthy cattle, having had no direct contact with the infected beasts; the second class must contain those cattle which, though not yet sick, may become so, because they have been in contact with those tainted; the third class will be composed of cattle smitten with the typhus.

The sound and healthy cattle forming the first class must be removed from the farm, and driven to the field separately, by some other road, in different pastures, and only after the dispersion of the morning mists. Those which are accustomed to continue at the rack must be taken out twice a day, for the twofold object of taking wholesome exercise, and allowing their stalls and sheds to be cleaned.

Their feeding must be attended to and watched with very particular care; the rations of those which were being fattened up must be decreased, and they ought to be sold to the butcher for consumption as soon as possible.

Let the following provisions be added to their daily sustenance :

Pounded oats	4 pounds.
Pounded juniper berries	1 pound.
Powdered gentian	1 ounce.
Sulphate of iron	2 drachms.
Carbonate of soda	2 „

The herdsman who tends the cattle whilst feeding in the fields must have them cleaned every day: he will carefully wash and scrub them; he will not allow them to drink out of the ponds, or at any stagnant and muddy watercourse.

Those belonging to the second class must receive the same strengthening and tonic ration in the morning; and, twice every day, one of the following anti-contagious preparations: either a solution of *chlorate of potash* or of *permanganate of potash*; two drachms of either of these salts dissolved in eight ounces of warm water, mixed afterwards with a gallon of an infusion of sage or hyssop, just at the time when the drink is given to them.

Or you may employ, for the same purpose, a solution of arseniate of soda—two grains dissolved in four ounces of water, and mixed

with their drink in the same way. You need hardly be told that these doses must be reduced one half, when you have to treat a calf or a heifer, and that the same diminution will hold good, in their cases, for all other medicaments. *The use of these anti-contagious drinks is of the highest importance; I recommend you earnestly to study their effects, and to continue them even after the distemper shall have broken out.*

These drinks having no disagreeable taste, the cattle take to them in general; should the contrary be the case, give them in a bottle as all men who are cattle owners know how to do.

If the health of any of these animals among which the outbreak of the typhus is apprehended should seem below the standard, you must apply a purgative to those whose bowels do not operate well, and even have recourse to bleeding in exceptional cases.

During the absence of those cattle which are undergoing the preventive treatment, let the hygienic conditions of their stalls and sheds be looked to; for no circumstance must be overlooked or neglected if we hope to withstand

the propagation of so formidable a malady. Be careful to take out the litter every day, to wash the floor and cleanse it of the droppings, to ventilate the place thoroughly, to fumigate it with burnt sulphur or aromatic plants, such as juniper berries, sage, rosemary, salted with nitrate of potash and arsenic acid ; in order to promote the combustion and give effect to its disinfectious properties. At night, camphor or tar, or naphthaline, or creosote, or even iodine, may be left in the stable to diffuse their vapours ; all these measures are very effectual in modifying the air.

Let us now see what must be done with respect to the sick animals themselves.

The typhus, as we have said, when once it is developed in an ox or cow, usually pursues its fatal course until the last period of its cure ; generally death alone can arrest its march. Besides, the disorders which this disease produces in the various functions of the body are not the same at the different stages of its duration. Thus, for instance, the fever produces great excitement in the beginning, but later it produces exhaustion. Without being a physician, a man can understand that the treatment to be

applied to these different states ought not to be the same. We must, moreover, observe that the typhus is of all known distempers the most difficult to treat. It requires in the doctor a degree of skill, of practical experience, vigilance, decision, and sureness of hand which no man can be expected to possess at the first outbreak of the epizootia.

On the other hand, the constitution of the ox, so easily shaken, undergoes in two weeks all the commotion which a man labouring under typhoid fever would be subject to in a month. The phenomena succeed each other with terrific swiftness, leaving scarcely time for us to act, or for the medicines to operate. Do not, therefore, marvel at the great mortality among your cattle, and at my repeated recommendations of the preventive treatment by means of inoculation.

At the outbreak, you must reduce the violence of the fever, prevent the derangements in connexion with the nervous centres, assuage the thirst, empty the stomachs and intestines, which will be the principal seat of the complaint, and sometimes let blood.

But how are you to obtain these results? •

By abolishing the solid feeding, which is easily done, since the animal has lost his appetite. Give him to drink, three or four times a day, half a pailful of a decoction of good hay, adding thereto a sprinkling of salt ; or a decoction of wall-wort, with a drachm of nitrate of potash ; or water whitened with bran and flour, or whey, with a little vinegar. If the animal has a tendency to cold, if he coughs, if his breathing is oppressed, give him warm drinks, consisting of an infusion of mallow leaves and borage, or else a light decoction of barley and oats, and cover the animal's body warmly over.

Now, with respect to purgatives : give the animal, night and morning, according to the effect produced, 6 or 8 ounces of Epsom salts (sulphate of magnesia), or an equal dose of Glauber's salt (sulphate of soda), dissolved in two pints of honey-coloured water ; or 12 ounces of linseed oil in some warm drink ; or a decoction of senna leaves and prunes, with an ounce of sulphate of soda added thereto.

We might point out a larger number of purgatives, but we shall desist from so doing. Those which we have just prescribed, not

being irritant to the intestines, are the best which can be employed.

If the animal is very restive, if he passes through alternate fits of dejection, stupor, and great excitement, you must have recourse to bleeding, particularly local bleeding, by opening the small veins of the head. If the excitement does not abate you must add, night and morning, to one of his drinks, 2 grains of extract of belladonna, or a half ounce of powdered belladonna leaves. If the fever, at first, is irregular, and tends to become malignant, you must then have recourse to sulphate of quinine, 20 grains in the morning, and the same quantity during the day.

When the disease is principally seated in the lungs, add to one of the pectoral drinks 4 ounces of oxymel of squills, and 2 grains of opium, giving also an emetic—5 grains of tartar-emetic to 4 pints of water—to be taken in four times, at intervals of two hours.

Whilst this medication is applied to the internal organs, let the animal have unusual care taken of him; let his head be washed several times a day with vinegar and water.

Such is the course of treatment to be

adopted during the first three or four days. It must be, of course, followed methodically, watching and obeying the signs of nature. The purgatives must not be given on those days when the sick animal is bled, and the doses must vary with the effects they produce.

From the fourth to the seventh day the symptoms change, diarrhœa shows itself, and the running appears at the nose, mouth, and eyes; you must then continue the use of purgatives, but the dose must be weaker. Those mentioned above are suitable in every way. The drinks, too, continue the same. Sometimes, at this period of the disease, the animal is utterly cast down, nothing can draw him from his stupor: he lies down the whole day; in this case you give him acetate of ammonia, from 1 to 6 ounces, in a pint of water, gradually increasing from 1 to 2 ounces a day, according to the effect produced; and meanwhile, plain non-acidulated drinks should be administered.

At this stage of the disease it is right to assist the depurative work of nature. This is effected by inserting a seton in the neck,

and the secretion of this issue is kept up by means of such an ointment as the basilicon with powdered cantharides. Finally, the mouth, nose, and eyes must be washed very often with an infusion of camomile and sage.

At the last period of the distemper, the beast sinks into a state of general exhaustion ; his life seems all but extinguished through excess of weakness. You must now sustain and keep him up by every possible contrivance ; give him bitter and stimulating drinks, beer diluted with water, adding thereto some powder of Peruvian bark, or sulphate of quinine. This is prepared by steeping in 8 pints of boiling water, Peruvian bark, gentian root, centaury leaves and flowers, and hops, 1 ounce of each ; or else prepare a drink consisting of veterinary treacle, extract of juniper, 1 ounce of each, dissolved in 2 ounces of alcohol, and then mixed with 3 pints of water.

When the diarrhœa becomes fetid and bloody, give, night and morning, a clyster composed of a decoction of Peruvian bark, and a teaspoonful of powdered charcoal from the poplar, well sifted. If the running from the

nostrils begins to stop, you must inject into the nasal orifices some spoonfuls of a sternutatory solution, thus composed—

Spanish pepper	1 ounce.
Essence of turpentine	1 „
Camphor	2 drachms.
Vinegar	2 pints.

Should any sores form on the skin, or should they arise from the opening of purulent deposits, dress them with the following ointment—

Acetate of copper	$\frac{1}{2}$ a drachm.
Calcined alum	20 grains.
Sal ammoniac	20 „
Camphor	$\frac{1}{2}$ a drachm.
Common ointment	$\frac{1}{2}$ an ounce.

If the natural heat diminishes greatly, if the chill reaches the hams and skin, let the beast be rubbed all over, three times a day, with wool, moistened with the following liniment—

Laurel oil	$\frac{1}{2}$ an ounce.
Green soap	$\frac{1}{2}$ „
Volatile oil of lavender	$\frac{1}{2}$ a drachm.
Solution of ammonia	$\frac{1}{2}$ „

Simultaneously with the above, give the

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following cordial, to be drunk in two draughts—

Cinnamon	$\frac{1}{2}$ an ounce.
Extract of gentian	1 ounce.
Red wine	2 pints.

Should the animal fall into a state of lethargy, you must have recourse to strokes of fire, according to surgical usage.

This distemper must extend to its extreme degree of gravity before it advances towards its cure; you need, therefore, not despair until the last moment. At this period of exhaustion, the drinks above-mentioned are given up, or you add nutritive beverages to them, such as beef-tea, fat soups, milk, and farinaceous drinks.

If the animal holds on, and his appetite returns, which will be shown by the desquamation of the nostrils, by the return of rumination, by the habit of the beast to look right and left, to question you in a manner, add cut straw to his nutritive drinks: send him out every day into the open air, and let him return by slow degrees to his habitual feeding. But it is extremely important to watch the intestinal functions; to diminish and change the food,

if the diarrhoea returns ; as such relapses often cause the death of an animal considered out of danger.

Such, then, farmers and graziers, is the treatment to be opposed to the ox typhus : it is simple as respects the remedies, and I have deemed that it ought to be so, in order that the medicines prescribed might be had everywhere, and at a cost which the poor man could command as well as the rich. The disease is variable, it is not always equally deadly ; and there comes a moment when in some sort it cures itself, with a little assistance and watching. The great point is, to be careful and vigilant, to attend to nature and the instincts of the suffering cattle, and lend yourselves to both.

I cannot reproduce here the instructions given by the Privy Council to protect your cattle from contagion, and above all not to propagate it, but I shall refer you to Doctor Thudichum's *Memorandum*, page 257. This exposition is too complete to need anything added to it by me ; study it well ; let it be your monitor and guide ; read it over again and again ; your own interests and those of the

whole country depend on the manner in which you shall treat this admirable warning.

There are in this disease, as in every other, unforeseen varieties and complications, such as those which are brought on by the gestation and abortion of cows, and those proceeding from prior disease; for these accidents you will provide. Moreover, such a terrible distemper can only be treated according to the advice of a professional man. Call him in, then, follow his advice and prescriptions with rigid exactness, and do not attempt to do better than he; and, above all, arm yourselves against the insidious pretensions of quacks and charlatans, whatever mantle they may put on to hide their ignorance.

FOURTH PART.

Suggestions on the Improvements to be effected in the Study of Medical Science, in order that we may be in a Condition to confront Diseases generally, but Epizootic and Epidemic Diseases in particular.

THE epizootia of bovine typhus which is now extending its unrestricted ravages over this island, and which has assumed the magnitude of a general calamity, has naturally excited and stirred up the public mind. Thoughtful and earnest men could not look on and witness unmoved the ever progressive march of the scourge; but each observer has, consistently with his means and qualifications, striven to find a remedy to resist the evil. Thus, we have seen, and with respectful interest we have watched, the gentlemen of the press, and other men of letters, economists, scientific men, and, above all, physicians, producing from day to

day in the newspapers articles and letters of remarkable merit on the all-engrossing subject of this epizootia. The re-opening of the medical colleges furnished the skilful professors at their head with a seasonable opportunity to consider this dire distemper, according to the views of general pathology and medical philosophy, and this they have done with unquestionable talent and ability. Still, something remains to be said on this important matter, and since I have taken up my pen, like others, I wish to mingle my voice with that of my brethren, and inquire whether the time is not come to avail ourselves more fully than we have done yet of the grand discoveries of the exact sciences, which, with respect to the science of medicine, are the instruments of its progress. And my object in doing so, is, that we may, as far as possible, rise to a level with the ordeal which the future may have in store for us.

Medicine is at once an art and a science. An art it has been at all times, and in every age of civilized man ; but it became a science only when human knowledge had acquired a certain expansion ; when natural phenomena had been

tested and explained ; when mathematics, physics, chemistry, botany, general anatomy, general pathology, had enabled the inquiring physician to study with important results whatever belongs to his theme ; to understand the serial chain and connexion of bodies with each other, in the mineral, vegetable, and animal kingdoms, and to investigate their immutable laws. Uric acid, as we see with the microscope, will always crystallize in rhombohedrons, according to a fixed law ; the vegetable cell, the germination of a seed, must obey, and always submit to, the innate and indestructible forces inherent in them. That which is true in the vegetable is true in the animal world, as regards the pre-established order which regulates and controls the phenomena of life. These laws which govern the development of organic phenomena being immutable and everlasting, permit the different generations which succeed each other on our globe to build upon a durable basis, which certifies to the slow and laborious, but irresistible march of human progress.

Medical science being in truth only the application of other positive sciences to the

preservation of health and the cure of diseases, continues like them to perfect itself incessantly; but all it can do is to follow them at a distance, and it can never hope to reach their degree of superiority.

These are truths which have been long admitted and felt by us. Therefore, we have appealed for assistance to the discoveries of the natural sciences: physics, chemistry, have in our hands become effectual means of observation and analysis; and we, in our age, gain more knowledge in fifty years than our forefathers did in several centuries, for they were then necessarily rather artists than scholars. In a word, medical science or biology is constituting itself, and if it be fully conscious of its impotence in the case of many diseases, it also knows its progressive improvement. It is striving to achieve the highest place among social institutions, and the day may come when it shall obtain it, for nations will then owe to us their health and life—that is to say, their earthly happiness.

The laws by which organic phenomena are regulated, are, we have said, everlasting; we may also declare that they are general. One of

these laws common to the plant, to the shell, to every species of vertebrata, reappears in man, whose organization comprises all the functions divided among the other organic kingdoms. Not only does the organization of man obey the laws which govern the vital phenomena of other animals ; not only does he possess their organs and functions, but he is a tributary subject to their diseases. So that the knowledge of the laws affecting the functions and diseases of those creatures which are placed below him in the scale of animals ought to be the first foundation of all medical study.

These truths are too manifest to be new ; they are written and professed everywhere, and every one amongst us has received general notions of comparative anatomy and physiology at the beginning of his course of study. But let us admit that these notions only served to expand the circle of our knowledge and ideas, and that we seldom or never apply them to the practice of our art. It would have been very different had we received at the beginning of our medical novitiate, not merely in theory and books, but practically and experimentally, precise notions of anatomy, physiology, and,

let me add, of the *pathology of all animals*. Let us suppose for a moment that the task had been imposed upon us before entering upon the study of human maladies, to observe the structure of plants and animals, to submit their tissues to microscopical examination and chemical analysis ; to study experimentally all their functions and diseases, and acknowledge that had such been the case, the anatomy, physiology, and pathology of man would have been far better understood, and that most of the difficulties against which we now contend in vain in our helplessness, might easily have been overcome.

Comparative anatomy and physiology are the first conditions of all medical instruction of a serious character ; there can be no doubt on the subject, but the evidence being not perhaps so palpable with respect to comparative pathology, it will not be useless, therefore, to enter into fuller particulars as to this subject.

We know not whether any one has ever sought to retrace the first origin of our diseases in the animal kingdom, but it would undoubtedly be a study of great scientific interest.

As for us, we gladly believe that man, created to be the sovereign lord of the earth, did not originally receive the principle of every organic disease with which we see him affected. It seems to us probable that he was created sound in body and in mind, but unequal in his vital powers, and in his faculties and talents, the social functions being various and dissimilar, and subject to physical and moral infirmities. We think it likely that plants and animals, from which, in course of time, man's substance is formed, have transmitted the first causes, the germs of some organic diseases with which they were themselves affected. We see in this transmission of animal diseases to man, a connecting link, which appears to us to be a condition of harmony, order, peace, and happiness among all living beings. It seems to us that the first injunction of a legislator should be—*love other animals like yourselves*; for if man had practised this maxim, he would have logically applied the same to his fellow-creatures; and no doubt, with such principles to guide them, past generations would not have bequeathed to us the innumerable calamities we have had to deplore.

We think that we receive from animals some of their diseases, because the fact is palpably evident; thus they have parasitical diseases, such as favus, tænia, psora, trichinosis, which they transmit to us. They are likewise smitten with small-pox, typhoid fever, and with typhus; and under certain given conditions they may transmit them to us. They die of consumption and cancer, and it is probable that they transfuse into us through their milk and flesh the germs of these diseases. Finally, we have our epidemics as they have their epizootics; and here we will limit our instances of this reciprocation.

It is certain that the study of these maladies in animals would have been for us the source of precise knowledge, which, if well understood and explained, would have often led to their preventive treatment. This is what has occurred in the case of small-pox; it is what will one day occur in typhoid fever, in times of epidemic, as will be the case in a certain number of other general or local diseases.

In truth, some complaints now looked upon as inherent to the human species, were originally foreign to it; most parasitical diseases

belong to this class. Thus man has not the *psora*, or itch—the disease does not properly belong to him; the parasite which engenders it is not bred in him, it is always transmitted to him by animals. It is the same with the *tænia*, or tape-worm, with the *trichina*, or fine hair-worm.

Medical science, instituted on the bases of comparative pathology, would have made the study of diseases in the brute creation, not the collateral, but the principal object of its inquiries. It would have applied itself to the cure of the lower animals; and whilst learning to cure them, it would have ensured the cure of men's diseases.

If such be the case, can any one believe that the treatment of diathetic and hereditary maladies would be, as they still are, insoluble problems; and that the physician would have the misery of seeing decimated, whilst he helplessly looks on, a large part of the population, condemned inevitably to die of consumption and cancer? Would every man smitten with hydrophobia be irrevocably condemned to death? Assuredly, it would not be so.

That the physician should have been reduced

to the painful necessity of confessing his want of means, when médecine could be nothing more than an art, we admit; but now that science has grown up and come of age, society has a right to challenge him to do, what in past ages could not have been expected of him. Briefly, we think that the time is come, by blending comparative pathology with anatomy and physiology, to construct one of the bases of the tripod on which medical science will have to rest. The success which has already been achieved in this direction is a certain guarantee for those which we may hope for hereafter.

Such is our deep conviction, and perhaps we have some title to speak out decidedly on this point, as we have long since exemplified our precepts by actual proofs.

Persuaded for many years that comparative pathology afforded to industrious men a new mine, rich in precious veins for working, we several times endeavoured to explore this fertile field. But, unfortunately, our means of action not being consistent with our sanguine expectations, we were repeatedly compelled to suspend our pursuits, until at last we found at the

Ecole Vétérinaire d'Alfort, the favourable opportunity and the essential conditions of which we had so long been in quest.

Grieved at our helplessness to stay the ravages of pulmonary consumption, I formed one day the resolution to study that wasteful complaint in animals in order to discover, or at least to look for, the required remedy. With that view, I confined in a dark, cold, and damp cellar a number of animals to practise on: birds of different species, rabbits, a monkey, a dog, &c. To these animals I dealt out a deficient quantity of food. The monkey, as might have been expected, was the first to be affected, since in our climates they all die of consumption. Next, and for the same reason, it was the parrot's turn; then the chickens and ducks died; after them the rabbits;—in fine, at the end of fourteen months, the dog alone survived. All the rest had sunk under consumption, and exhibited tubercles in different organs—in the lungs or mesentery.

It was then necessary to have the counter-proof: to place a second set of animals in the same conditions, to produce the disease again, and attempt its cure. But the first experiment

had been a long one, and I was forced to relinquish the inquiry, which, moreover, was above my means at that period.

On another occasion, it seemed to me strange that we should be obliged to open the bladder of patients suffering from the stone, or to subject them to lithotrity, which has also its perils. Nature, I said to myself, forms calculi by uniting organic elements, by crystallizing them, and by cementing them with vesical mucus. But would it not be possible to cure the disease by employing contrary means—dissolving the calculi in the bladder by means of continued injections, changing the chemical agents according to the composition of the calculus, and adding thereto the action of a galvanic current?

After this, I pursued my inquiry in this direction. I studied for several months the chemical composition of calculi by examining them in their dissolved state; and I saw that those in which the alkaline bases prevailed, being submitted to a diluted solution of tartaric acid, which would not injure the bladder, crumbled after a time; that the calculi with excess of acid were also attacked by an alkaline

solution ; in fine, that the calculi of oxalate of lime alone seemed to resist the action of these chemical solutions. But it is well known that they sometimes defy all lithotrite instruments, and compel us to have recourse to the knife.

These preliminary experiments over, it was necessary to come to their application, and for that purpose to make experiments on some animals. The canine species, omnivorous like ourselves, was chosen in preference. Bitches were selected to be practised on ; for as their urinary passages are wider and more flexible, it enabled me to insert in the bladder fragments of calculi already analysed, which were to serve as the nuclei to the stones they were intended to develop.

This second assortment of animals, penned up apart from each other, were supplied with different modes of sustenance : some of them were put upon a diet of meat only, others on a farinaceous diet, and a third set on a mixed course of food. These experiments were being regularly followed up, when an important and unforeseen event compelled me to desist at the end of six months. The poor animals were destroyed ; but all of them, as I

had anticipated, had generated calculi of various chemical composition.

These unfinished inquiries concerning comparative pathology, thus interrupted in spite of myself, might, had circumstances allowed them to reach the goal, have authorized us to undertake in man the dissolution of stone in the bladder. And how would this have been effected? By seizing the stone between the two ends of the catheter with the double current, and by injecting a well-sustained series of dissolvents into the patient, whilst lying at his ease in a recumbent posture.

Nor is this all. They would likewise, I believe, have thrown some light on the organic production of calculi, on the lithic diathesis, and the particular formation of the stone; and led us, in some degree, to their preventive treatment, which is always superior to the curative remedy.

On a subsequent occasion, I betook myself to my task under more favourable conditions. I undertook at Alfort, conjointly with Professor Delafond, a course of experiments on the cutaneous diseases of animals in relation to comparative pathology, having already,

whilst walking the hospitals, published a work on the "Entomology and Pathology of Psora in Man," which had been printed at the expense of the Academy.

These inquiries and examinations at Alfort were persisted in for five years, and were considered to have led to very satisfactory results as regards general pathology. But I have spoken of these labours in the first part of my book.

Pardon me, reader, and do not suppose that vanity or any desire to parade myself has induced me to refer to these experiments. No; my only object is to show to what results similar studies might lead, if they were executed on a large scale and on the whole animal kingdom; if, instead of these partial efforts made under favour, some special and appropriate medical institution encouraged earnest experimentalists, supplying them without stint with all necessary resources, and with the best and completest instruments of observation.

Will any one deny, that if medical science had been settled on this foundation fifty years ago—that is to say, since the exact sciences

first began to provide us with the means of investigation, — it would now be so impotent? Epizootias and epidemics would not thus flout us as they do ; the cholera would no longer be an enigma, nor the ox typhus so incurable. No ! a hundred times no ! Medical science would not be helpless and impotent in our day, had our forerunners been more mindful and provident.

But, instead of this, the science for which we plead would have done good work. It would have made and confirmed an infinite variety of observations on the brute creation ; it would have transmitted our diseases to them as they transmit their diseases to us ; it would have treated and cured these diseases, and every such cure would have been a new triumph, a new victory for mankind.

For instance, during an outbreak of cholera, this science would have been ready and prepared to try different experiments on men and animals ; it would first have communicated the cholera to animals, and then submitted them to a variety of experimental treatments. This cholera, which is not an infectious fever, with its regular and assigned periods, like

typhus, and which we are not obliged to suffer to run its course, but which, on the contrary, is a nervous affection produced by some poisonous miasma, the toxical effects of which first of all assail the nervous system and then more particularly the great sympathetic; the cramps being but the result of a reflective action — *this cholera, we say, must be curable*, and well-advised experiments would reveal the remedy we want for it, nor should we have to wait long for the revelation.

As for me, I once made a desperate attempt in this direction. It was during the cholera of 1854. We remarked whilst dissecting subjects, as is always the case, that the mucous membranes of the stomach and intestines, which were in a manner paralyzed, had suffered the fluid parts of the blood to ooze out on the surface. Hence the cause of those vomitings, and those watery and colourless diarrhœas which nothing can stop, so that at a given moment the patients die, poisoned, of course, but dying more particularly through want of circulation, the blood being reduced to its solid parts and unable to circulate any longer. Relying on this fact, and trusting for

want of better to the secondary effects, I strove to restore to the blood its aqueous part, and, if possible, to re-establish the circulation.

With this view, I went to the Hôpital de la Charité, provided with all the requisite instruments. Choleraic patients were being brought there every hour. The experiments being new, venturesome, and *dangerous*, in the eyes of the hospital directors, I was only suffered to operate on the moribund. The first patient, considered to be in a state sufficiently desperate to be given up to me, was a woman, forty-five years old. She was literally insensible, and thoroughly cold. I hesitated for a moment to try the operation under conditions so unreasonable, so preposterous—almost upon a corpse. The radial arteries in the arm had ceased to beat, and the heart alone kept up a feeble circulation at the central parts. At length I opened the vein, from which not a single drop of blood proceeded, and taking the usual measures to prevent the air from having access, I gradually and slowly injected two ounces of alkaline solution, the process of injection lasting twelve minutes. It was scarcely over before

the patient half-opened her eyelids, and looked about her with astonishment; the pulse became perceptible for a few moments, and all present thought she was saved. We put a few questions to her; the patient could not answer us, but she nodded as much as to say "yes," when asked if she felt better. But this was all we could do in her case. The circulation stopped again, the patient relapsed into her state of insensibility and died two hours after the injection.

The result obtained in this instance had not answered our expectation. However, the circulation had for a minute or two resumed its course, and a flash of reason had once more shown itself.

I thought the experiment ought to be repeated, and accordingly the next morning I made another trial. The patient this time was a working shoemaker, thirty-eight years of age, exactly in the same far-gone, hopeless state as the patient of the day before. In his case, the inward commotion caused by the injection was more powerful; twenty minutes after the injection he was able to see, to understand, to speak, to raise his head; but this vital re-

covery was, as in the former case, but of short continuance, and two hours and a half after the operation the man expired.

After these experiments I dissected the two bodies, and then, finding that their lungs were infiltrated with water, I understood that the alkaline solution had not been assimilated, that it had stopped in its passage into the pulmonary parenchyma, to the detriment of the functions of the hæmotosis. I also understood that the proper injection, instead of distilled alkaline water, would have been the serum of the blood, drawn at the very moment from some man or animal.

The conclusion which I drew from these experiments was that a variety of operations, made at different stages of the malady, might lead to beneficial results, especially if we succeeded in transmitting the cholera to animals, as that would enable us to test a large number of curative agents and to pursue a methodical course of experimentalization.

From all I have said, I infer that life, health, and disease, being subject to the same laws throughout the whole animal kind, it is certain that the physician should possess precise

knowledge as to the organization, the functions, and diseases of animals. That by proceeding in this manner, we shall advance from the simple to the complex, from the plant to the animal, and from the animal to man. That we must of necessity emerge from the state in which we are now entangled BY FOUNDING AND ESTABLISHING IN LONDON A COLLEGE OF THE NATURAL AND MEDICAL SCIENCES. Every medical pupil might spend two years in this college, receiving in it an experimental and practical training ; he would devote himself in it to the chemical analysis of all bodies, to physiological experiments and tests, without limit and of every kind.

Most deeply do I appreciate the many difficulties and obstacles that would interfere with the execution of such a design. In our civilized age, nations seem rather bent on seeking out the means of exterminating each other than of protecting themselves and animals from epidemics and epizootias. It is believed that every first-rate kingdom now spends from 400 to 500 millions of francs (16 to 20,000,000*l.*) annually in maintaining their land and sea forces, whilst one-half of their populations are

living in misery and ignorance, in disease and corruption. The time is not come—shall we ever see it?—to employ the vital powers of the peoples, to better incessantly their social condition. Perhaps, by reason of its organization, the Government of this country would not be authorized to devote 100,000*l.* or 200,000*l.* to the establishment of an institution like the medical college I suggest, notwithstanding its paramount necessity. But England is in the habit of doing great things independently of the Government. In default of the ruling powers, then, let me appeal to the national initiative, for if the spectacle which we are at present witnessing was not, in the case of England, one of those trials which invigorate a people by the salutary teachings which they bring; if it did not induce them to take some energetic resolution by which their interests would be saved and their power enlarged, it would indeed be a deplorable sign of the times and make us despair of its future.

Moreover, to show the urgency of founding a *College of Natural and Medical Science*, let us add, that in every other country they are endeavouring to unite this indispensable comple-

ment to medical education. The German universities, the Faculty of Paris, have, for several years past, incorporated a course of comparative pathology, with the other series of public lectures.

It is not a mere Utopia that we propose, but an extension and improvement, all the parts of which are already prepared. If this College could be thrown open to-morrow, competent professors would be ready at the call of duty to indite the programme for this instruction within twenty-four hours; and as for the professors themselves, there would be enough to choose among the large body of efficient scholars who do honour to the country.

If we have been rightly understood, we desire to see established in London an institution which would afford an equivalent to what exists in Paris, at the Museum and Collège de France, where numerous courses of lectures on anatomy, physiology, physics, and chemistry are given. Only in London this special college would be formed and organized on such a scale as to bear away the palm from every previous foundation of the same kind; it would be an institution unexampled in the world, out

of whose halls would one day come anatomists, physiologists, and pathologists of the very highest order of excellence.—But organic matter would not be the sole object of this instruction, for the animal is something more than matter. Courses of medical history and philosophy, of really general pathology, would introduce the students to the grand phenomena of nature, to the great laws which govern the worlds and the globe; and descending from the heights of science to the observation of the infinitely minute, they would never forget the important part of the vital powers, and of that unknown power called at different times by the names of πνευμα, *archée*—*mind* and *soul*.

The Regent's Park would, we think, be the proper site for this college, as the contiguity of the Zoological Gardens would afford continual opportunities for investigating the diseases of animals.

Moreover, this college would not trench upon or interfere in any manner with those medical and veterinary establishments which at present exist; it would ally itself with, and complete them, nothing more. The

instruction received at this "College of Natural and Medical Science" would be so useful and necessary, and so attractive withal, that the sons of the great families would come to it to finish their collegiate studies, to the great benefit of the country. Other young men, in considerable numbers, would flock to it from various parts of the world. The foundation of such an institution would be an epoch in the history of science, and would give England another claim to the esteem of nations.

I conclude, then, with a conviction that a nation which owes to Lord Bacon, the founder of experimental philosophy, his imperishable book on the *restoration, the method and teaching of the sciences*; to Harvey, the circulation; to Priestley, the constitution of chemistry; to Sydenham, the modern Hippocrates, his treatise on "Practical Medicine"; to Jenner, vaccination; and to Charles Bell, the discovery of the sensitive and motor nerves—is a people too great and too enlightened to retrograde; and that, if the epizootia of ox typhus did find them at first unready and disarmed, they will in the end convert this

disaster into a new source of greatness and strength.

Such is the sincere hope which I cherish and the prayer I offer up for the happiness of a country which, for the future, has become my own.

APPENDIX.

NOTE A.

BREMEN, August 30.

THE following report, drawn up by two German veterinary surgeons, of a recent visit to London to examine into the cattle murrain, has been furnished by the agent of the North German Lloyd's at Nordenhamm :—

“ On Wednesday, the 9th instant, we, the undersigned, were requested to be at Nordenhamm, if possible, the following morning. Upon our arrival we were asked by the agent of the North German Lloyd's, who had consulted with several of the chief cattle exporters, to undertake a voyage to London at once in the steamer *Schwan*, in the interest of the cattle export from the Weser. The object of our mission was, first, to examine as closely as possible into the epidemic cattle disease raging in and around London for some time past; then carefully to observe the treatment of cattle upon the vessel during the voyage, upon arrival, and at the time of disembarkation; lastly, to use every means in our power to prevent obstacles being opposed to the continued export of cattle from these ports to England.

"Furnished by the agent of the North German Lloyd's with letters of introduction to cattle dealers in London, and with the necessary funds, we left Nordenhamm in the steamer *Schwan*, Captain Christensen, at 4 P.M., on the 10th instant. The vessel carried 347 head of large cattle, 2 calves, and 260 sheep. Favoured by very fine weather, we arrived in the Thames at 2 P.M., on the 12th. At the beginning of the voyage the animals were rather uneasy, trampled a good deal, and caused considerable motion in the ship; after a time, however, they became quiet. A sharp, penetrating smell was easily perceptible in the 'tween decks of the ship, which was quickly removed upon a light breeze springing up, by means of the excellent ventilation and numerous air-pipes and wind shafts. The animals were several times watered, and it was easy to see how greatly they were refreshed. The hay in the racks, on the other hand, was hardly touched.

"Upon arriving in the port we were introduced by the captain to the two veterinary surgeons stationed here to inspect the cattle, and witnessed the rapid disembarkation of the cargo, all of which were thoroughly healthy, not one being condemned. The cattle, when landed, were immediately brought to carts standing in readiness and transported to London, where they are cleansed and then driven into the adjacent fields.

"After doing all in our power to attain the object of our journey, we went back to the port to wait for the *Schwan*, having first thoroughly cleansed the clothes we had worn during our inspection of the

diseased cattle. The *Schwan* came in shortly after our arrival, and disembarked 256 head of large cattle, 12 calves and 400 sheep, all in good condition. Mr. Philipps, the London agent of the North German Lloyd's, was on the spot, together with several reporters from newspapers, who wished to see by personal investigation how and in what condition cattle are brought from the Weser.

"We re-embarked on the *Schwan* upon the 19th. The crew were engaged during the voyage in carefully cleansing the ship. The weather was fine, and we arrived safely at Nordenhamm upon the 21st.

(Signed)

"G. J. RIPPEN,
"Veterinary Surgeon at Seefield.

"H. FASTING,
"Veterinary Surgeon at Schweg."

NOTE B.

Professor Simonds having had such opportunities of investigating those diseases as they existed in England and in foreign countries as were possessed only by a few Englishmen, might be permitted to offer a few observations. He had been appointed by the Royal Agricultural Societies of England and Ireland to proceed to the Continent in 1857, when there was a rumour that the disease which existed among cattle in this country at the present time was prevailing in Mecklenburg. Consuls sent despatches that the rinderpest was prevailing largely, and the Government, as a precautionary measure, closed the ports against the introduction of cattle from the Baltic to this

country. He found, however, from his observations abroad that since 1817 there had been no disease of this kind westward of a line between Revel in the Baltic and the Gulf of Venice, but to the eastward of that line it had existed. He came up with the affection at the Carpathian mountains, where it was raging in 1857 just as it is raging in England at the present time. Not only had it existed there, but it had been carried into the interior of Russia in the ordinary method of the cattle trade. A person who was in the habit of purchasing cattle attended a fair and bought a number of animals, and took them to his own farm, and in the course of ten days one or two were seized with the disease, and the result was there was a gradual spread of the evil in that district. It gained ground until the Government instituted the sanitary police regulations, which, though they were such as would be considered strange in England, were, he believed, absolutely necessary for the extirpation of the plague. It was undoubtedly true that no foreign animals had been seized at our ports or in the metropolitan market; but it was not necessary for the case they had in hand to say whether the disease was or was not of foreign importation. There was this fact before them, that it was not until the month of June that the disease appeared in England. A certain number of animals came out of a diseased district. He had documentary evidence that animals came from Revel and came from the district of Esthonia. He had before him proof that the disease now in England was raging in that district. They had proof that shortly after the arrival of those cattle in England the disease manifested itself

here. He admitted there were difficulties in the way of checking the importation of foreign cattle. The Government had its eyes open to the matter, and he did not think it possible for the Government to have done more than they had done or to have done more quickly what they had been doing. At this moment half the supply of the metropolitan market came from foreign countries, and he did not wish to convey any reflection by saying that this disease had its origin from abroad. He would admit that the animals from Germany and Hungary were coming in a healthy condition ; but he could not admit that they came from Russia, Poland, or Galicia in so perfect a condition, because the regulations there were not sufficient to stamp out the disease. The Government had made an inquiry as to the general health of cattle on the Continent. They believed France, Belgium, Holland, Schleswig-Holstein, Oldenburg, and a large part of the Continent that supplied cattle to this country were free from disease. This went to show that we had admitted a disease not from where we received our supplies of meat, but from some other district. Then it must be associated with the fact that it came into this country when animals arrived here from an infected district in Russia. Animals from Germany and Hungary were often shipped and mixed with others from a diseased district. As regarded the disease being spontaneous, we had been free from it for twenty years. What was the state of our cowsheds fifty years ago ? Were they not in a more filthy condition than they are now ? If, therefore, the disease had been induced from common causes it would have been here years and years ago.

It was no reflection to say that a great many cases could be traced directly to the metropolitan market. Take one case which occurred in Sussex. Certain cattle had been bought in the metropolitan market and were taken home. In three or four days they were ill, and presented symptoms of this affection. In a few days more the cows and calves were dead. In another instance calves were bought in Chichester Market, where they had been taken from London. The result was the death of twelve cows and ten calves. The people had other cattle on the same farm, and not one of them took it. He could say, too, that persons who had only one animal had lost it by the disease. How had the disease got into Norfolk and Kent but by the animals which went from the metropolitan market? He could prove by documentary evidence that it was so. He could show there was not a single instance where the origin of the disease could not be traced to the metropolis. It was the most fearful visitation that had ever been seen in England. They had adopted a system of compensation in Norfolk, and if by this meeting something was done to shut out the animals of infected districts, no doubt the promoters would receive not only the thanks of London, but the country generally.

Mr. Gibbins—Now, if the disease came from abroad, and diseased cattle were shipped on the other side of the sea, no doubt the voyage would concentrate and aggravate the disease. The Government inspectors reported, however, that not one instance had been seen of foreign cattle so diseased, nor had any been seized and destroyed in London or anywhere else. Whether

the disease came from abroad or elsewhere he was not able to state. Sir George Grey asked him whether he had found any disease among the foreign cattle that came into the market. He said not one. They had, no doubt, many instances of the disease amongst the cows that were ordinarily called milch cows, but that were not milch cows when they came to market, because one effect of the disease was to deprive the animal of milk. These were then sent to the market and sold as fat stock. He could only say they had had no cases, except in cows, whether they came from the dairies in London or elsewhere.

NOTE C.

M. Dembinski, Professor of Analytical Chemistry and Natural Science, had also addressed a communication to the Lord Mayor on the subject. The prevalent Rinderpest, he said, originated in the steppes of Podolia, from which considerable herds of cattle were exported through the steppes to Moscow, St. Petersburg, Riga, and Revel, and thence to the ports of Memel, Königsberg, Dantzic, Hamburg, Kiel, and the Hague. *Deprived of congenial food and pure water on their transport through the steppes, and then arriving at marshy lands, the exhausted animals drank the stagnant water, which, during hot weather, exhaled a pestiferous malaria, and infected them with a predisposition to the epidemic in question, which developed itself into a kind of fever on the voyage to England in a crowded condition.*

NOTE D.

INTERNATIONAL VETERINARY CONGRESS, VIENNA,
August, 1865.

With regard to the cattle plague, it may be well to state that Austria has been most unfortunately situated, from the readiness with which Russian cattle have been admitted into the country at various parts of the western and southern frontiers. At the opening of the Congress this difficulty was particularly noted by the Ministerial counsellor, Dr. Vell, who attended on behalf of the Government, for the purpose of welcoming the assembly, and giving an assurance that its deliberations would meet with all the attention they deserved. He specially referred to the fact that the laws relating to cattle disease prevention had been entirely revised in 1859, but that the Steppe murrain continued to be introduced by smuggled stock into the western and southern provinces of the State. It was therefore necessary to attempt a more effectual control over the propagation of so disastrous a malady.

Herr Pabst welcomed the meeting on behalf of the Minister of Trade. He said that the value of the cattle of the Austrian dominions considerably exceeded one hundred million pounds sterling (one thousand million Austrian florins), and that cattle plagues completely put a stop to the development of that essential branch of agriculture which embraces the improvement and increase of live stock in a country. He assured the assembly that all would be done that was possible to improve the existing state of matters, and

that he hoped they would greatly aid the Government by the discussions which would take place and the conclusions at which they would arrive.

I may state, by the way, that an opinion rather generally expressed by some, and stoutly maintained by others, was that the peculiar disposition of some of the Austrian subjects, and the feeling existing in Hungary against State measures, rendered the law, to a great extent, inoperative. I can, from personal experience, state that although stringent and most efficient means are used for the suppression of cattle plagues, and with the best results in Austria proper, there is great difficulty in carrying out the law in districts where Austrian rule is at a discount. Indeed this is clearly indicated by the manner in which the Rinderpest penetrates into Austria, where the laws are similar to those in the kingdom of Prussia, which is, and has long been, completely protected from invasions of the disorder.

At the meeting of the first International Congress, held in Hamburg in 1865, Dr. Röhl stated that owing to the length of time to which the quarantine for Russian cattle extended on the Austrian frontier, herds of cattle were often smuggled through, and companies had been formed for the purpose of insurance against seizure by the authorities. The unlawful traffic was therefore carried on with comparative safety to the dealers, who cared not what misfortune they brought on a country if only their personal ends could be served. This question was the first to occupy the attention of the Congress last week; when a resolution was proposed to shorten the period of quarantine

for cattle from Russia into any country from twenty-one days to ten. The discussion was keen. It was stipulated, however, that the quarantine should be carried out most strictly over all parts of the frontier, without respect to any breed of cattle or other circumstances which might be brought forward as exceptional reasons for retaining animals in quarantine. The committee appointed to prepare a succinct report on the subject included Professors Unterberger, Seifmann, Werner, Zlamal, Hertwig, Haubner, and Röhl; and the committee decided in favour of the shortened quarantine, on the following conditions :—First—When the establishment of quarantine institutions is effected in accordance with the requirements of trade and the peculiarities of the frontier, special attention must be paid to the erection of quarantine stables, &c., where there are facilities for procuring an abundance of fodder and water. Second—The animals to be kept under efficient veterinary supervision wherever they have to submit to quarantine. The inspectors must be properly qualified veterinary surgeons. Third—The use of a brand to indicate that the animals have been in quarantine. Fourth—The effectual disinfection, by washing and otherwise, of animals as they leave the quarantine. Fifth—The introduction of a poll-tax along the eastern frontiers, and the appointment of proper veterinarians to be on the watch as to the health of cattle along the frontiers. Sixth—Careful supervision to be placed over the traffic in cattle wherever it takes place in a country. Seventh—The punishment to the full extent that the law allows of

all who break the rules relating to quarantine or other means for the prevention of the cattle plague.

Professor Hertwig, of Berlin, whose opinion is always listened to with great respect in veterinary circles, stated his reasons for adopting these resolutions now, whereas in 1863 he was against shortening the period of quarantine. He referred chiefly to the importance of not offering temptations for cattle dealers to evade the law by insisting on unreasonable restrictions. The feeling of the assembly was greatly in favour of avoiding vexatious and expensive measures, which might greatly interfere with the employment of capital in cattle traffic. A small number of professors, not exceeding eight or nine, held out for a quarantine of twenty-one days.

It may be as well to state that quarantine regulations, which have been regarded as almost useless in the prevention of human disorders, from the great difficulties in the way of carrying them out efficiently, are recognised as of great value in controlling the propagation of cattle plagues. It is possible to control the movement of herds, and the governments of Central Europe have found it absolutely essential so to do. Indeed, the ablest medical men who have written against the adoption of a quarantine system for human small-pox and cholera, such as Professor Siegmund, of Berlin, acknowledge its value and absolute requirement with regard to the Rinderpest. A professor from Galicia argued in favour of controlling the movements of people wherever the disease appeared, and no fact seems to have been better ascertained than that of the communication of the Rinder-

pest from herd to herd by human beings. Professor Jessen, of Dorpat, states that in Russia the malady was at one time speedily propagated by the people, who regarded the destruction of their stock as a visitation of Providence, and who summoned a priest into their stables to pray with them that the plague might be stayed. Moving from farm to farm, the malady was by this means rapidly transmitted. In Hungary, many outbreaks result from people dressing the carcasses and hawking about the meat, which, even where human beings remain uninjured, is deadly to the cattle whenever the water with which it is washed is thrown about the yards, or the meat is hung up near sheds containing living animals.

The members present at the International Congress spoke in favour of establishing a fund, apart from the Government grants, for the payment of diseased or infected animals which have to be slaughtered with a view to the prevention of the plague. Special precautions were suggested as to the transmission of articles the product of diseased animals.

1. Perfectly dried skins, the points of horns cut off, as they often are for commercial purposes, the salted and dried intestines of cattle, melted tallow, wools, cowhair, &c., could be freely allowed to pass unobserved.

2. Entire horns, hoofs, &c., which are detached from the soft parts, but which often contain adhering flesh, &c., should be disinfected with chloride of lime.

3. As melted tallow is often conveyed in bags which may be charged with the poison, those bags should be washed with chloride of lime solution.

4. Fresh bones, fresh skins, and intestines, unmelted tallow, raw flesh, and fresh sheepskins, should not be sold whenever the Rinderpest exists in a district.

According to all the accounts which reach us, the foreign observations and resolutions may be of essential service in England. The members of the Assembly were informed by Mr. Erner of the origin and the progress of the cattle plague in England, and were deeply interested by the account given of the imminent danger in which many countries are placed that purchase breeding stock in the British isles. The theories of spontaneous origin amuse the learned here not a little, as they justly think we ought not to be so far behind every nation in the possession of knowledge regarding the propagation of such a disorder as the steppe murrain.

NOTE E.

Now, if the disease came from abroad, and diseased cattle were shipped on the other side of the sea, no doubt the voyage would concentrate and aggravate the disease. Whether the disease came from abroad or elsewhere he was not able to state. Sir George Grey asked him whether he had found any disease among the foreign cattle that came into the market. He had not one. He could only say they had had no cases, except in cows, whether they came from the dairies in London or elsewhere. So far as they knew, not one single bullock or ox had been condemned.—MR. GIBBINS, 18th August, Meeting at the Mansion House.

The very first shed in which the plague must have appeared in London is a pattern of cleanliness, and

the stock was magnificent, as proved by the animals in a shed to which the disease has not been propagated. Almost simultaneously the malady broke out in the Essex marshes, and in every instance we trace a more or less direct contamination by foreign stock.

NOTE F.

VIENNA, August, 1865.

On the 28th of August about thirty of the members of the Congress accepted an invitation to visit the renowned agricultural establishment at Altenburg, in Hungary. After the visitors had inspected the herds and other appurtenances of this institution, Professor Maasch, its director, intimated that the Rinderpest had appeared at Nickolsdorf, about four German miles from Altenburg. The President of the Congress had known this fact before the party left Vienna for Hungary; but as he feared some enthusiasts would first see the plague, and then inspect the Altenburg herds, he preferred to adopt the stratagem of communicating the information through Professor Maasch, after the great Agricultural College of Hungary had been viewed. Nickolsdorf, where the steppe murrain appeared on the 10th of August, is an exquisitely clean village, with well-whitewashed buildings and broad roads, constituting the centre of a thriving agricultural district. Its people are typical Hungarians, not too anxious to work, and, on the whole, poor; but they are intelligent, notwithstanding the national proclivity to farm a thousand acres badly rather than one-fourth the quantity to perfection. Their wants

are not great, and their worldly luxuries, beyond potatoes and schnaps, are bought with the profits made on large herds of cattle. One herd only had suffered from the cattle plague when we visited the village. This herd consisted of 1225 animals, divided into three lots. The affected portion numbered 450 animals—bullocks intended for work and slaughter—varying in age from three to seven years. The cows and heifers had not been smitten. The 450 animals amongst which the disease appeared were housed in no less than sixteen different sheds in Nickolsdorf. Out of each of these places sick animals had been taken, and either slaughtered or permitted to die. We killed four for dissection on the 29th. Six more had been previously killed, their hides slacked, and the entire body buried; nine had died, and two we left in life to be soon slaughtered and disposed of as the others. The district veterinary surgeon in constant attendance was an extremely active and intelligent man, who recognised the disease on its first outbreak, and adopted such measures for separation, destruction, and burial, as prevented the disease from spreading so rapidly as it has in England.

The cause of the outbreak was the intermingling of cattle-dealers' stock with the Nickolsdorf herd; and although the animals which carried it have not been fully traced, they are believed to have been owned by a butcher who had purchased them in Comorn, where the malady is raging. Singular variations have been seen in the symptoms exhibited, especially when animals are first affected. During the Nickolsdorf outbreak there has been an invariable incubation of five or six

days; then furor or delirium appears: the bullocks stare, roar, stamp with their feet, are prepared to attack people who approach them, and seem to be dizzy at intervals. They shiver, their muscles twitch, the eyes soon begin to discharge, and the mucus which flows from the mouth foams. The pulse is at first slower than usual, until all the fever symptoms appear. There is more constipation than diarrhoea, though, on examination, the mucous membranes are all found to be affected precisely in the manner so often observed in England during the present outbreak. The differences in the symptoms are accounted for by peculiarities of breed, the condition of stalls, the food the animals have lived on, and similar circumstances. We may hear more of these Hungarian outbreaks, but the chances are we shall not witness in any part of Austria the wholesale devastation now going on in Great Britain.—*International Veterinary Congress.*

NOTE G.

At present the cowkeepers send off the infected beasts to the market, or to some slaughter-house, where they might be killed. There was believed to be great danger in allowing the infected cows to be driven through the streets. If the good could be separated from the bad animals, and if the latter could be conveyed to sanitoriums, where the medical men could operate upon them, then much benefit would result; and then, too, if the animals died, they would be buried on the spot. All the professors were agreed in this, that if a compensation fund were raised, and

the cowkeeper were told that he would be remunerated for his loss, he would at once inform the authorities when the disease made its appearance in his cowshed. Shed after shed was being now shut up, and men and women who seemed to be affluent one day were the next reduced to ruin. An illustration of this would suffice. One day last week a cowkeeper at Pimlico had 70 or 80 healthy cows. On Wednesday three of them were found dead. On Thursday 42 of them were sent to the market. Of these 42 three showed symptoms of the disease, and then the whole of the 42 beasts had to be slaughtered because of the disease being among the three. The poor fellow was thus ruined. Last Monday he sent nine more cows to the market, and these also had to be slaughtered. At present the man was absolutely out of his mind. Out of his 70 beasts, he had not one left. Some persons were saying that the disease arose from bad water, bad ventilation, and bad cowsheds ; but in the case of Miss Burdett Coutts, who had had 40 head of cattle, which were most carefully housed and attended to—particularly from the moment she heard that the disease was amongst them—all were gone, with the exception of one cow ; so that, whether it was a want of water or a want of ventilation which in other cases caused it, this was an instance in which everything was done that could be done, and yet the plague raged and the mortality ensued.—MR. GIBBINS, *Meeting at the Mansion House.*

NOTE J.

Yesterday morning Dr. Jarvis, medical officer of St. Matthew's, Bethnal-green, received information that Mr. Castell, an extensive purveyor of milk, had lost eighty-four cows during the past week. Other cowkeepers in this district have also experienced great losses. The disease has manifested itself with more or less virulence at St. Anne's, Limehouse; St. John, Hackney; St. Mary-le-Bow, St. George's-in-the-East, St. John, Wapping; Christ Church, Spitalfields; St. Leonard's, Shoreditch; St. Mary, Whitechapel; St. Paul's, Shadwell; the hamlet of Ratcliff, Stoke Newington, Kingsland, and Tottenham.

Mr. Gibbins, chairman of the Metropolitan Markets Committee, Mr. Rudkin, a member of the committee, Mr. Tegg, veterinary surgeon to the market, and Mr. Baldry, clerk to the market, applied to the sitting magistrate at Clerkenwell Police Court yesterday for summonses against cowkeepers for sending diseased cows into the market. During the course of the present week no less than nineteen cows had been seized in the market and lairs and condemned. The order was asked for under the 8th section of the recent Order in Council, which recited that it shall not be lawful to send or bring to any fair or market, or to send or carry by any railway, or by any ship or vessel coastwise, or to place upon or to drive along any highway, or the sides thereof, any animal labouring under disease. The cattle seized had not been examined by a Government inspector, and no certificate

had been given to the owners that they were fit to be removed. The market authorities wished it to be known that proceedings would be taken in every case that was brought under their notice. Mr. Cooke observed that the inspectors had power to seize and slaughter, or cause to be slaughtered, and to be buried in any convenient place, any animal labouring under the disease. Had that been done? Mr. Tegg said that the animals were in some of the cases slaughtered, and the others would be slaughtered in the course of the day. The summonses were granted.

Yesterday, the summonses issued at the instance of Mr. Frederick¹ Thomas Stanley, a member of the Royal College of Veterinary Surgeons, and one of the inspectors appointed under the Order in Council, came on for hearing before Mr. Burcham, magistrate at the Southwark police court. The summons in the first case was addressed to Thomas Meredith, of the Flying Horse-yard, Blackman-street, for that the defendant, without the licence of the said inspector, did unlawfully remove from his premises some animals labouring under the cattle disease. Mr. Sleigh, instructed by Mr. Gant, appeared to support the summons; and Mr. W. Edwin for the defendant. Evidence was given that the defendant had been warned that the cows were diseased, but that he had removed them notwithstanding. The further hearing of the case was adjourned, as were also the other summonses of a like nature.

In pursuance of powers vested in him by the Manx Legislature, the governor of the Isle of Man has issued a proclamation prohibiting the importation of

cattle into the island. Under the same Act his Excellency has power to subject all cattle imported into the island to a five days' quarantine.

NOTE K.

Tracing, as we have done, the sale of infected stock from abroad as far back as the 19th of June, we find that each week that the disease has been amongst us a fresh county has been contaminated ; and more than that when we consider that Scotland has not escaped.

NOTE L.

SCOTLAND.—The cattle plague has travelled North to Aberdeenshire, and has killed a number of animals almost simultaneously on three farms at many miles distance from one another. The owners of stock in one of the districts, and the Royal Northern Agricultural Association, are taking, or resolving to take, sharp and prompt steps to stay the progress of the disease. The committee of the association having met on Friday, appointed a committee of inspection, arranged for a public meeting of persons interested, and favourably entertained the notion of forming a fund for mutual insurance against the sacrifices and losses which the extension of the disease might occasion. A meeting of the General Central Union was also held at Stirling on Friday, and a committee was appointed to confer on the subject with the directors of the Highland Society, and report to another meeting to be held next Friday.—*Scotsman*.

The most important communication received to-day is from Scotland. The malady has undoubtedly broken out near Kelso, on fourteen head of cattle imported into London and sent north. Twenty-eight animals have been seized with the disease at Woolwich, and calves from the London market are said to have taken the malady down to Horsham and Grinstead.

Information has been received concerning the sale of at least fifty-four diseased and infected animals in the Metropolitan Cattle Market the 3rd instant.

NOTE M.

Mr. Charles Panter has, at the request of Earl Granville, drawn up a statement relative to the health of the cows on a farm hired by his lordship at Golder's-green, on the Finchley-road. In publishing the statement, Earl Granville says: "When I left England, a month ago, there were about 130 milch cows in four sheds. In the two largest and best managed I found only one cow yesterday (Sept. 4). His Royal Highness the Duke of Coburg informed me last week that what he believed to be the same disease visited Coburg last year. No one could trace its origin, and no medical treatment was successful. Air and water were their only remedies. Some men had died from eating the meat killed at a particular stage of the disease. His Royal Highness had seen a horse die in four hours, killed by flies which came from the carcase of a cow which had been allowed to remain above ground. The disease disappeared in the autumn as mysteriously as it had come. I understand that Pro-

fessor Simonds is of opinion that the disease mentioned by the Duke of Coburg is not the same as that from which we are suffering here—that its name is the Siberian Pest.” Mr. Panter’s statement is dated Sept. 4, and is as follows :—“ On the 13th of July I purchased five Dutch cows in the Metropolitan Market, and placed them in quarantine at Child’s-hill Farm, one mile from here. On the 22nd of July one of them showed signs of debility ; diarrhœa followed. Thinking it was only a cold, she was treated accordingly, but continued to get worse, and died in five days. Two more were attacked in a similar way, when veterinary advice was called in, but in five days the whole either died or were slaughtered. Every precaution was used to prevent the spread of infection here ; the men who attended the sick cattle were not allowed to go among the healthy ones, and *vice versa*. But, previous to this, hearing of the disease in the London cowsheds, I adopted precautionary measures, such as a liberal use daily of chloride of lime, administered one ounce of nitre in half a pint of water to each cow, and a small quantity of tar, and painted their noses with tar. But on the 8th of August, unfortunately, the disease showed itself here in a fat cow that had been for ten months in the best built, best drained and ventilated shed. No new stock had been added for nine weeks. In a few hours four more cows showed symptoms of it. I immediately had them all removed and slaughtered, and made a *post-mortem* examination of them, and found the windpipe in a state of decomposition, the lungs inflated, the small intestines red and inflamed, and the meat of a dark

yellow colour outside, and dark red inside, which I think unfit for human food after the first stage. The disease confined itself to the above shed of forty-eight cows (which are now all gone) till the 20th of August, when it broke out in another shed of thirty-five cows, some ten yards from the former one, and continued its ravages, taking from two to four cows daily, till they are all gone but two, one of which has not been attacked; the other, which was a bad case, is cured, and partly come to her milk again. On the first symptoms I had her separated from the other stock, and did not treat her for two days, when diarrhoea set in; I then gave her a bottle of brandy and four ounces of ground ginger in three quarts of old ale. She lay in a kind of stupor for twelve hours, when I could see a change in her for the better. I continued to give her daily four quarts of gruel made with old ale and two ounces of ginger. In four days she was sufficiently recovered to eat a little hay, &c., and do without further treatment. In another case the above treatment failed, and the animal died in three days. In other cases I allowed anyone to treat them who thought they had a remedy, both professional men and others. One persevering young veterinary surgeon came up out of Somersetshire and treated two cases most energetically, but failed in both; one died in four, and the other in eight days. In other cases tonics, stimulants, blisters, and setons have been tried, but all failed. The whole of the eighty-one cows lost were of the English breed; we have not as yet had any loss out of the other two sheds, consisting of about half English and half Dutch cows, and standing about forty yards from the infected

shed. It may be interesting for your lordship to know that I had the shed at Child's-hill Farm immediately cleansed with disinfectants, and washed with hot lime, &c., and bought twelve fresh cows and placed them there on the 16th, which are now in perfect health; and a neighbour situated midway between here and that farm had twenty-three cows lying in a field; the plague took twenty of them, and in three weeks he replaced them with new stock, which are still healthy, he having had them a month. Another neighbour, a mile distant, had a fine herd of seventy-two cows (English) lying in the fields a fortnight ago. The plague broke out among them, and now he has only eight left in health. From my own experience, and from all I can learn, I believe the disease is atmospheric, and of a typhoid character. The first symptom in a milking cow is an almost entire loss of milk, then loss of appetite, a watery discharge from the eyes, nostrils, and mouth, which thickens as the disease develops itself; rumination ceases, her ears hang down, her eyes are heavy and sunken, bloody matter is seen in the excrement, great debility is seen, diarrhœa sets in, and death takes place in from three to nine days. I have read of iron water being a preventive of the disease. All the water your cows have drunk comes six miles through rusty iron pipes."

NOTE N.

THE CATTLE MURRAIN AT HOLLY LODGE.—On the 27th of June an Alderney bull was purchased at Bushey, near Watford, and placed with the rest

of the herd, then consisting of eleven cows, five sucking calves, three yearling heifers, and one bull. The bull had been imported from Alderney for several months. About a month after—namely, on the 29th of July—a cow in calf was attacked with unusual symptoms. She was separated from the rest; nourishing drinks were administered; but, having calved, she died forty-eight hours after the first symptoms were observed. This led to the belief that she died of the disease which then began to prevail. This cow had been pastured with the others in a field occasionally used for grazing sheep that were taken to the Metropolitan Cattle-market, and, if not sold, brought back again until the next market day; the sheep were separated from the cows by iron hurdles. The Holly Lodge Estate is partly bounded on the east by the route taken by drovers with foreign and other cattle to and from the market, some of which are also occasionally brought back to neighbouring fields. The high road forms the western boundary within a few yards of the cattle-sheds and pastures. These facts are stated to show that the contagion might have been easily communicated to the animals. A few days later three calves were attacked with cold shivering and twitching of the muscles. The previous nights having become suddenly and unusually cold and wet, the symptoms were at first attributed to that cause. Although these calves had been pastured quite apart from the cow which first died, the cow had been driven across the field where the calves lay to the shed in which it died, the calves having been placed in the next shed, where two of them died on the 6th

of August, unmistakeably of the cattle plague. The third calf was sent to the Royal Veterinary College, where it also died. By the 9th of August four cows and the bull were seized with the disease so virulently that it was thought necessary to kill them after three days' illness. On the 12th a cow and a heifer were also destroyed, and on the 14th one of the sucking calves died. Thus, out of a herd of nineteen animals, twelve had died within a fortnight. The malady had taken so strong and sudden a hold upon them that no systematic means of remedy could be applied except separation, warmth, stimulants, and the medicines ordinarily given in cases of cold and fever. On the 13th of August two more cows were pronounced incurable by two of the veterinary surgeons who had been called in; but it was determined, upon further advice, to try a mode of treatment upon them not hitherto adopted. One drachm of calomel was administered in gruel, four hours afterwards one pint of castor oil, and three hours later one quart of yeast. About two quarts of warm porter were added to a gruel of yeast and oatmeal, and given at intervals. These remedies acted most efficiently, and in one case gave much encouragement. The next day the cow began to eat hay, to chew her cud, and to yield a good quantity of milk. These remedies, together with bi-sulphate of soda, which invariably produced a return of the milk, and quinine, were then tried upon four other patients, with varied success. But in the end all these cows died, not, it is believed, of the cattle murrain, but of exhaustion occasioned by the activity of the drugs administered to them. This

belief was strengthened by the healthy appearance presented by the viscera of the first cow thus experimented upon, on its being partially dissected after death. The remaining cow thus treated is still alive. It is impossible to avoid believing that had the medical man who kindly gave his attention to these animals, been better acquainted with the constitution of the creature, or had those who tended them had any knowledge of medicine, three of the cows treated in this manner might and probably would have recovered; and even when the animals succumbed the consequences were less serious, the virulence of the poison being expelled—at least it was undiscernible to those who dissected them. During the fortnight that the murrain was raging, one cow in calf and one calf remained perfectly healthy, apparently, until both were seized within a day of each other; these had always been kept separate from the sick animals, and tended by other men. The calf died, and the cow was destroyed, in consequence of the symptoms being so violent. In this case very little calomel was given. As it may be as well to mention all particulars, it may be stated here that the men who tended the animals were provided with a dress, and that it was found desirable that a certain quantity of stimulants—brandy, coffee, and strong soup—should be given to prevent nausea and other uncomfortable feelings from which the men suffered. All the directions respecting the burying of the animals issued by the Privy Council have been strictly complied with; clothes, &c., have been burnt, chloride of lime (Macdougall's disinfectant) was used with others

to destroy insects and flies, with abundance of white-washing. The men were recommended to use, as a wash for the mouth, manganate of potash. The first crop of grass in the field where the cattle lay before their sickness, and during it, has been destroyed also ; and it is intended to use some disinfectant, such as charcoal or lime, to spread over the field. Miss B. C. feels so persuaded that some mode of treatment could be found to alleviate, if not to save life, that she has determined to employ a medical gentleman, who kindly offers his services, and to take also the advice of a good cow or veterinary surgeon, and to try the effects of various remedies in some of the cowsheds where persons will be glad to let such experiments be tried ; and it is also her intention to ask the Privy Council to allow one of the Government Inspectors to assist and report upon the cases. It may not be altogether unimportant to add that the state of the atmosphere seemed to have some effect upon the health of the animals, as upon those occasions the symptoms were most severe during the thunder-storms which then occurred. The milk which returned was found to be rather watery, and the cream had a peculiar appearance. At first the pigs declined it, and it was not thought advisable to continue to give it at all to any animals for about a week. It is now perfectly good.

NOTE O.

Advices from Holland, dated the Hague, Sept. 6, state : "The cattle disease has now been observed

in the parishes of Kethel, Delfshaven, Moordrecht, Uaardingen, Averschie, Kvalingen, Nieuwerkerk on the Issel (two hours from Rotterdam), Spykenisse, Schiedam, Herjansdam, Maasland, Sommelsdyk, and Zevenhuisen. It has spread most at Kethel, where it first broke out among a cargo of cattle not admitted into England. In the other parishes some sixty animals were infected on the 1st inst. The post-mortem examination of the diseased beasts presents the abnormal appearances that have been found in the disease elsewhere, *i.e.*, swollen mucous membranes with red spots, peculiar exudations in the fourth stomach and intestines, &c. The medical commission declares the malady to be the *typhus contagiosus bovum* of modern veterinary surgery, and recommends that infected animals should be treated with from three to four drachms of muriatic acid, mixed with six ounces of treacle and decoction of linseed. Decoctions of Peruvian bark and osier peelings, with sulphuric ether, are also said to be beneficial to weak animals. The avoidance of all contact of the cattletenders with infected beasts is especially enjoined, and ventilation and cleanliness of the stalls strongly recommended. Cattle markets and fairs are suspended until further orders, and extraordinary measures for disinfection are applied upon steamboats and railways."

NOTE P.

The following document has been received at the Foreign Office from her Majesty's Agent and Consul-General at Bucharest :—

*(Translation from the Official "Monitorial," No. 173,
August 8—20, 1865.)*

GENERAL DIRECTION OF THE SANITARY SERVICE.

From the 1st to the 15th July a typhus epizooty broke out among the large horned cattle in the districts of Ilfov, Jassy, Bolgrad, Falcin, Buzeo, and Roman, which still continues, but is on the decrease. The Direction, in consequence, publishes the above for the information of those concerned.

The Director-General,
(Signed) D. GLUCH.

Aug. 2—14, 1865.

NOTE R.

August 14.

THE QUESTION OF INFECTION.—Yesterday afternoon Mr. Alfred Ebsworth, of 11, Trinity-street, Southwark, the medical officer of health for the parish of St. Mary, Newington, attended before the sitting magistrate to make a statement with regard to the condition of the parish from the influx of diseased cattle, and the manner in which they were disposed of. Addressing the magistrate (Mr. Burcham) Mr. Ebsworth said that on that morning he, in his capacity of medical officer of health for the parish of St. Mary, Newington, received an order to attend professionally a man who was seriously ill in Kent-street, within the parish. While paying the visit to the patient his attention had been drawn to the condition of a slaughter-house on the other side of the street, where

it was reported to him there were fifteen cows which had been ordered by the Government officer to be destroyed at the Bricklayers' Arms Station, and then to be buried. The animals were accordingly destroyed by the men in the employ of Mr. George Nicholls, the proprietor of the yard in question ; and from Mr. Nicholls he had learned that, instead of the carcasses of the animals being buried, they were carted through the parish of St. George's to Mitcham, where they were boiled down, and brought back through the parish of St. Mary, Newington, in the shape of cats'-meat. He (Mr. Ebsworth) felt it his duty to come before the magistrate with this complaint, especially when the cattle plague was so prevalent. He had a right to inquire upon what grounds the carcasses had not been disposed of on the spot where they had been slaughtered, instead of being carted through the parish he represented, in a way calculated to spread the infection. He could not but regard this as a most iniquitous proceeding, and he attended with a view to prevent a repetition of the practice. Mr. Frederick T. Stanley presented himself, and said that he was a member of the Royal College of Veterinary Surgeons. He had been appointed an inspector of cattle under the orders issued by the Privy Council. Within the district there were no means of burying the carcasses of the diseased and condemned animals, and in the instance referred to they could not have been buried in the cowshed. It was impossible to bury the carcasses in the London districts, and hence they were sent to the knacker's yard, where it was supposed they would be disposed of. Mr. Ebsworth :

And that, your worship, is what I complain of. Mr. Burcham: You think that the practice to which you have called my attention is calculated to propagate the extension of the disease. Mr. Stanley declared that the skins were disinfected under his especial orders. Mr. Burcham remarked that the animals had been taken to the slaughter-house, not for the purpose of being killed and buried, but that their skins should be taken off and disinfected. Why should they have been taken to Mitcham? Mr. Stanley stated that the disease could not be communicated from a dead animal, and it was conveyed only by inoculation, or through the breath of a living animal upon the dead body of a diseased ox. Mr. Burcham: I do not agree with you in that opinion. I believe that infection may be conveyed by a dead animal. Mr. Ebsworth said that such was his opinion, and, having regard to 28,000 patients in the parish, he had felt it his bounden duty to come forward to make this complaint. He thought such things ought not to occur. Mr. Burcham was of the same opinion, and that such a commodity ought not to be allowed to be conveyed through the public streets in open carts. Just before the magistrate was about to rise, Mr. Stanley introduced to his worship Professor Simonds, and a long colloquy (in private) ensued between them. At its close Professor Simonds retired, and Mr. Burcham said: I wish to state that I wanted to be satisfied that everything was done by Mr. Stanley that could be done under the circumstances by which he was surrounded, in the midst of great difficulty. I have had an interview with Professor Simonds, and he informs me

that there are the greatest difficulties, if not impossibilities, in finding any places near London in which the dead carcasses of diseased animals can be buried. In the case now before me these animals were slaughtered at the Bricklayers' Arms Station, and were then taken to the slaughter-house in Kent-street, under the notion that the owner of the slaughter-house had the means of boiling them down. It appears that he had no such apparatus, and hence he found it necessary to send the carcasses to Mitcham, the nearest place at which he believed the carcasses could be buried and disposed of, and the neighbourhood thereby disinfected. Professor Simonds is perfectly sure that this meat when boiled down cannot by any probability cause the infection to spread. It was possible, but not probable, that infection might be introduced by the carcasses of the diseased animals on their way to the place where they had to be boiled down; but it appears to me, from what I have just heard, that every precaution has been taken to prevent such an occurrence. It seems that the authorities cannot find a place within a reasonable distance in which the carcasses can be buried, and, therefore, they are obliged to have recourse to boiling them down, as the only alternative. It is right that I should add that the conduct of Mr. Stanley, the inspector, has been quite in conformity with the directions he has received, not only under the Orders in Council, but also sanctioned in my presence to-day by Professor Simonds. I trust that this statement will remove from the mind of Mr. Stanley any unfavourable impression he may have entertained; and I will only add my opinion, that

B B

the diseased cattle ought to be removed through these populous districts in closed and not in open carts. The conversation then closed, and at an unusually late hour the court adjourned.

DISEASED MEAT.—At the Thames Police Court yesterday Henry Frost, an old man, was charged with having allowed to be deposited on the premises occupied by him in the rear of the house, No. 18, Sidney-street, Stepney, four quarters of beef prepared for sale and intended for the food of man, but which was unfit for human food. Frost carried on the business of a greengrocer. He asserted that he let the place to other men, who were the actual offenders. It was intimated that the vestry had no disposition to press for a heavy penalty. Mr. Paget fined the prisoner 40s. At Clerkenwell, Mr. Tegg, inspector at the Metropolitan Cattle Market for the City authorities applied to Mr. D'Eyncourt for an order to destroy a quantity of diseased meat which he purposed seizing. Mr. D'Eyncourt said the meat must be actually seized and condemned upon evidence before he could make the order. In the matter of the seizure of 32 quarters of beef, weighing about 3000 lbs., which was found on the premises of a knacker in Pleasant-grove, Belle-isle, Mr. D'Eyncourt dismissed an application made against the defendant under the Nuisances Removal Act. The defence set up was that the meat was recognised as bad and diseased by the killer as soon as the animals were slaughtered.

NOTE S.

The Orders in Council seemed only to complicate the matter, and how effectually to combat the evil was a most difficult question. Some said the grand remedy was the knife, and others suggested that the diseased animals should be sent to a sanatorium. To destroy the diseased cattle was impossible, except the owner of them or the inspector went round and obtained an order from a magistrate for their destruction. The last meeting was adjourned, among other purposes, in order that the committee might take the opinion of the law officers upon the subject. It so happened, however, that most of the law officers of the Corporation were at present out of town. Fortunately the Common Serjeant was found, and he gave an opinion which confirmed the committee in their view that they had no power to kill, and no power to do anything except in the matter of isolation. Then the committee passed a resolution that another committee ought to be formed to raise the necessary funds for compensating the cattle-owners, and to see that those funds were properly applied, for the money was only intended to apply to the cattle plague, and was not meant to go in the shape of compensation for pleuro-pneumonia, or for the foot diseases. In other words, they were now legislating for the cattle plague or Rinderpest only. He resided at Dulwich, and he found that in the villages adjoining there were many cows, and never in his life had he seen finer cows. Not one of them had been affected

by the disease. There was a cowkeeper at Peckham who had 200 cows, and all of them were in the most healthy state. At Brixton Hill a man had 30 cows in the same excellent condition. At Dulwich nearly all the cows were diseased, but there the shed and other accommodation was exceedingly bad. In parts of Peckham Rye some of the cowkeepers had lost their cattle, but there again the places were badly ventilated, and the cows were badly cared for. He believed that the disease might be prevented by the use of proper precautions on the part of those who had the greatest interest in keeping their cows in a healthy state. He believed, too, that this question affected the whole of the metropolitan district quite as much as it did the City itself. There were no fewer than 106 head of diseased cattle lately seized; but, as he said before, they could not be killed without an order from a magistrate, and a magistrate would naturally feel a difficulty in issuing an order to kill so many as 106 head. It was necessary, under such circumstances, that a deputation should wait upon the Home Secretary and ask him to provide a remedy, and tell the authorities what they were to do at such a crisis. If, as it now appeared, the inspectors and the markets' committee had been slaughtering beasts without authority, who was to pay the costs should proceedings against them be commenced? Professor Simonds seemed to think that next session a bill of indemnity would be introduced, and certainly something of this kind was rendered necessary, for cattle were now coming here which were consigned to A., B., and C., and then the owners could not be

found, and without the consent of the owners the diseased beasts could not be killed. The next subject in the report had reference to slaughter-houses. As there were no places at present to which cattle in an incipient stage of the disease could be removed from the sheds in which they were placed along with untainted cattle, it was now proposed that slaughter-houses should be established in London for their reception. Then came the question, how were the beasts to be removed from the sheds to the slaughter-houses? It was the opinion of many that they ought to be removed in vans, and not driven through the streets; but, however that might be, slaughter-houses should be erected in the metropolis where the tainted animals might be killed. Then came the question, how was an animal to be dealt with when first stricken with the disease? It was suggested that hospitals or sanatoriums should be provided, to which the beasts should be sent. But this was a matter of great importance, to which the attention of the committee to be appointed and that of the medical men would have to be directed. If the plague went on it would affect all classes, rich and poor alike, and instead of meat being as now at a reasonable rate, it would go up 4*d.* or 6*d.* per pound; but he had hopes that the disease might be checked, particularly as Professors Simonds and Gamgee had been more successful in the treatment of it than they had previously been.

NOTE T.

August 31.

DEPUTATION TO THE HOME OFFICE.—Yesterday afternoon the Lord Mayor proceeded from the Mansion House to the Home Office, and had an interview with Mr. Waddington on the subject of the cattle plague, and the desirability of establishing hospitals or sanatoriums within the metropolitan districts for the reception and medical treatment of diseased cattle. His lordship was accompanied on the occasion by the following deputation from the Markets and Cattle Plague Committees:—Mr. Gibbins (Chairman of the Markets Committee), Mr. Webber, Mr. Gower, Mr. Brewster, Mr. Rudkin, and Dr. Jarvis (the Medical Officer of Health for Bethnal-green). Sir George Grey having left London for Falden,

The Lord Mayor introduced the deputation to Mr. Waddington, and in doing so, said that their object was to obtain the sanction of Government to the establishment of hospitals or sanatoriums within the metropolitan districts, to which diseased cattle could be conveyed from the cowsheds in order that they might there receive medical treatment, and be, if possible, restored to health. He observed that similar establishments had been formed at Edinburgh and other large towns, and that they had been found to work most satisfactorily, not only in separating the diseased cattle from those which were non-diseased, but in affording facilities to the medical profession to exercise their skill and knowledge under circumstances

more favourable to a fair trial of both than they could expect to find in crowded cowsheds, many of which were in a filthy condition and badly ventilated. He pointed out the progress the plague had made, and was still making, in the metropolis, and how its effects upon the high price of meat and milk were affecting all classes of the community. The difficulties, he said, of adequately meeting the necessities of the case were at present very great, and some of these consisted in the alleged illegality of slaughtering diseased animals without an order from a magistrate, and also the illegality of removing those diseased from the cowsheds to the hospitals, supposing the latter to exist. But he hoped the Government, who had no doubt well considered a subject of such vast importance, would speedily do away with those difficulties, and render the fullest aid to the Markets' Committee and Metropolitan Cattle Plague Committee, who were unceasingly devoting their time and attention to mitigate, and, if possible, put an end to the evil. At present, however, the object of the deputation was limited to that of obtaining the sanction of the Government to the establishment of the hospitals or sanatoriums. This was an object which had not only received the general approval of the two committees mentioned, but also of the medical profession, and he might add, what it was by no means unimportant to bear in mind, that the cowkeepers themselves and the salesmen of the Cattle Market were also in favour of it.

Mr. Gibbins and the several members of the deputation corroborated what had fallen from the Lord

Mayor, and strongly advocated the necessity of having the hospitals speedily established.

Mr. Rudkin called the attention of Mr. Waddington to the fact that the day before there were fourteen diseased cows seized at the slaughterhouse of the Cattle Market, which had been sent there from the cowsheds of the metropolis. He argued that this in itself was a proof that the Order in Council, as at present carried out, was insufficient to prevent diseased cows from being sent from the cowsheds by their owners to be slaughtered for human food.

Mr. Waddington, who listened very attentively to the whole of the statements, said he would take an early opportunity of communicating with Sir George Grey upon the subject. In the first instance, however, he wished the deputation to forward to him their views in writing, and these also would be transmitted to the Home Secretary.

The deputation promised to comply with the suggestion, and thanked Mr. Waddington for the courtesy with which he had received and the patience with which he had listened to them.

YORKSHIRE.—The plague has extended to this district. The cases reported, however, are extremely few, and precautions are being taken which it is hoped may stop the further progress of the disease. On Tuesday a meeting of the Yorkshire Medical Veterinary Society was held at Leeds, and the question was discussed in all its bearings. It was stated that four cases had occurred in Leeds, and the disease has also appeared in the Skyrack division of the Riding. The general result of the discussion was, that members of

the society were recommended, when diseased cattle were submitted, not to order them to be killed, but to place them in a sanatorium for medicinal treatment; the wholesale destruction of the animals being regarded as a blot upon the profession.

NOTE V.

Indeed, information has reached us of the disease existing in Dumfriesshire, but there is some doubt on this point. So long as we hear of infected, or probably infected, cattle being disseminated in large numbers from the great markets of the country, we must have the propagation of the malady. For the welfare of this country, it is deeply to be regretted that our Government cannot deal with this question as Continental authorities do. *I regret to say some of our neighbours laugh at our expense.* They see us helpless owing to the wretched state of our laws on the subject, and they are not a little amused at the theories of spontaneous development of the disease which some still advocate. The French Emperor has sent over Professor Boulay, who is still in this country, and who telegraphed on his first arrival, about ten days ago, that the ports of France should be instantly closed to British cattle. This has been done, and we may depend upon it the French people will not suffer as we now must.—GAMGEE, *Lettre du 24 Août.*

NOTE Y.

August 16.

MORE SEIZURES OF DISEASED MEAT.—Yesterday Mr. Paget, in the course of the proceedings at the

Thames Police Court, was informed that there was a large quantity of meat in a van in the police-yard adjoining, which had been seized that day by Mr. J. Stevens, the sanitary inspector of Mile-end Old Town, and which was described as unfit for human food. The inspector stated, that in consequence of having been informed that there was a quantity of diseased meat at the shop of Mr. Frost, butcher, Sydney-street, Mile-end Old Town, he went there that morning, and found four quarters of beef (two fore and two hind quarters) which were from a diseased beast. He made a seizure of them, and heard that the animal had been sent by a person of the name of Stephens, a cowkeeper in business on Bow-common. The meat was in a very nasty state, and totally unfit for human food. (Mr. Paget went into the police-yard to examine the meat, which was in a very shocking state.) Dr. Freeman, Medical Officer of Health of the Hamlet of Mile-end Old Town, stated that his attention was called to the state of the meat by the sanitary inspector. He examined it, and gave his opinion that it should be destroyed, as it was not only in a diseased condition, but he believed that it had died from some disease. Mr. Paget: Can you state the nature of the disease which caused its death?—Witness: I cannot. Most likely it was the prevailing epidemic; and if it were eaten it would be very injurious. Mr. Paget, after hearing the evidence, ordered that the meat should be immediately destroyed, when the inspector took the van with its contents to a knacker's yard to see the order carried into effect.

NOTE Z.

NEFARIOUS ATTEMPT TO SPREAD THE PLAGUE.—Yesterday Mr. Gifford, Sanitary Inspector to the parish of Paddington, asked (at Marylebone Police Court) for the magistrate's advice under the following circumstances :—Applicant said that, in consequence of information received, he yesterday went to a cow-shed situate on the Maryland Farm, Harrow-road. He found the door fastened. On looking through one of the chinks, he saw a cow which apparently was in the worst stage of the now prevailing disease, and his opinion was verified after he had burst open the door and examined the animal. He subsequently ascertained that the diseased cow had been brought some distance by a man who was at feud with the owner of the Maryland Farm, and surreptitiously placed amongst the healthy cattle. This was the first case where the disease had shown itself in the parish of Paddington. Mr. Yardley referred the applicant to the Order in Council, dated the 24th of July, 1865, under which he thought inspectors of nuisances had power to act summarily.

THE END.

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